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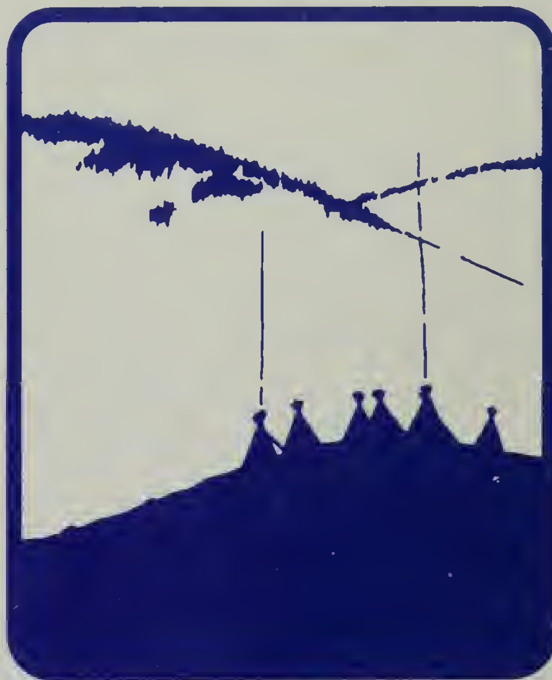

JACKSON COUNTY, COLORADO

Joseph J. Lischka
Mark E. Miller
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David McGuire

BUREAU OF
LAND MANAGEMENT
COLORADO

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AN ARCHAEOLOGICAL INVENTORY IN NORTH PARK, JACKSON COUNTY, COLORADO

BY

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BUREAU OF LAND MANAGEMENT

DENVER, COLORADO

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A Craig District, Colorado Publication

DESIGNED BY: Leigh Wellborn
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FOREWORD

This document presents the first major study of the prehistory of North Park, the northernmost of the three intermontane basins in Colorado. The archaeological investigations were conducted by the University of Colorado for the Bureau of Land Management to determine areas suitable for leasing and mining coal. These data have also provided baseline information for the preparation of a land use plan encompassing North Park.

Investigations conducted in 1977 and 1978 reveal a long and rich prehistory in North Park, where a number of prehistoric cultures utilized the natural resources available in this region. The record of these peoples is a valuable and fragile legacy of their efforts to survive in a harsh environment.

I am pleased to make this monograph available to the public and to interested students of prehistory in North Park and the Rocky Mountains. The preservation of information through publication is an important tool in the management of our fragile and precious heritage.

George C. Francis
State Director
Bureau of Land Management
Colorado

PREFACE

I have endeavored to assemble a document which will be useful and informative to both professional and general interest audiences without loss of information or comprehension by either group.

The information which has not been included is the exact locations of archaeological sites and Appendix C which presents management recommendations. Technical information has been placed in appendices and some of the chapters rearranged, however, the main body of the report is as submitted.

I trust I have not done an injustice to the fine effort of Dr. Lischka and his students and hope that this monograph is of value to all who read it.

Michael Piontkowski

Editor

ACKNOWLEDGEMENTS

This project would not have gotten off the ground, so to speak, without the enthusiastic participation of most of the project personnel, both in the field and in the laboratory. Special thanks are given to Mark Miller for his unflagging attention to detail and his insights and to Jane Anderson for providing the theoretical foundation of the functional analysis of the artifacts and for initiating the laboratory phase of the project. I also wish to thank David McGuire, Kathie Joyner-McGuire, Branson Reynolds, Dennis Dahms, Meredith Matthews, Robert Lawrence and John Montgomery for assistance above and beyond the call of duty.

A number of North Park residents provided valuable assistance. Marvin and Beverly Fuqua provided a temporary home for the field personnel and generous hospitality. Many pleasant hours were spent at Rancho Deluxe. John and Hazel Gresham were helpful informants for North Park history; and Done Gore, Don Bourbeau and Rob Morris generously shared their knowledge of sites in North park. Ken Lutz, of the SCS District Office in Walden, was particularly helpful in obtaining information on the environment of North Park. Don Fiero of the IAS and Beth Walton, the BLM Craig District Archeologist, have been particularly helpful and supportive under occasional trying circumstances.

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I. Introduction

I. INTRODUCTION

At the request of the Bureau of Land Management, through Interagency Archeological Services, an archeological survey was conducted of 25,100 acres of land administered by the Bureau of Land Management in North Park, Jackson County, Colorado. A total of 151 prehistoric sites, 14 historic sites and 322 isolated finds were recorded during the survey. The artifactual remains recovered from these sites and environmental characteristics of the sites and their catchment areas were used to further define the prehistoric chronology of North Park, construct a typology of prehistoric settlements and analyze prehistoric subsistence-settlement systems in the Park. The environmental data used in the analysis were derived in part from range site descriptions provided by the U.S. Soil Conservation Service. Although the areas surveyed do not constitute a representative sample of North Park or of environmental zones in the Park, the results of the analysis provide a basic outline of prehistoric subsistence-settlement patterns in that area. These are a combination of general adaptations to high altitude park environments and specific adaptations to unique characteristics of North Park.

The results of the analysis show a higher prehistoric population density in North Park than had previously been expected. A definite association of certain settlement types with areal concentrations of potentially edible wild plant species was also observed. It appears that prehistoric occupation of North Park occurred primarily during the

summer. The association of several sites with certain environmental characteristics, however, suggests some degree of prehistoric winter occupation.

A continuing problem in interpreting the prehistoric record of North Park is the lack of information concerning post-Pleistocene changes in climate and environment. During the project, however, two areas have been identified that are likely to provide important data for developing a climatic sequence for the Park. The Hebron Sloughs depression contains lacustrine sediments that offer potential for palynological and microfossil analyses. The Case Flats area may also contain similar deposits.

The relatively high number of projectile points recovered from the sites permitted a relatively detailed chronological analysis of prehistoric occupation. All known periods of prehistoric occupation in the Rocky Mountain area were represented in the site assemblages. Little significant change in locational variables of the sites indicates relatively little change in adaptations through time. This is based on the assumption, however, that the contemporary environment is similar to past environments.

II. The Natural Environment of North Park

II. THE NATURAL ENVIRONMENT OF NORTH PARK

by Joseph J. Lischka, Mark Miller and R. Branson Reynolds

The pattern of human occupation and utilization of an area is affected significantly by environmental factors. Consequently, the natural environment of that area must be known before prehistoric and historic developments can be properly understood. In this chapter is described those aspects of the environment of North Park that were or may have been important factors affecting human occupation of the Park.

PHYSIOGRAPHY

North Park is one of several intermontane basins in the central and southern Rocky Mountains. Other intermontane basins in Colorado include Middle Park, South Park and the San Luis Valley. Mountain ranges surrounding the Park define its boundaries and constrict movement in and out of the Park. The Never Summer and Medicine Bow Ranges are on the east side of the Park, the Park Range lies to the west and the Rabbit Ears Range forms the southern boundary. The Park is partially blocked

on the north side by the Independence Mountain fault block. Access to North Park is limited largely to several mountain passes and to the north end of the Park where elevations are lower and the topography is less rugged. In the southeast, Cameron Pass, at an elevation of 10,276 ft. (3132 m.), connects North Park to the eastern foothills through the Cache la Poudre Canyon. Willow Creek Pass, at an elevation of 9683 ft. (2951 m.), connects North Park to Middle Park. Muddy Pass, at an elevation of 8772 ft. (2674 m.), provides access to the west and south.

North Park is roughly oval in shape and is approximately 50 miles long (81 km.) and 30 miles (48 km.) wide. The area of the Park depends on the definition of its boundaries. For the purpose of this study, the western, southern and eastern boundaries are defined as the drainage divide of the North Platte River. The northern boundary separates the interior drainage basin of the North Platte headwaters in the Park from the North Platte River Valley north of Independence Mountain (cf. Figure 1). The area of the drainage basin thus defined is 1179.2 sq. mi. (3054.1 sq. km.) or 754,688 acres (305,542 hectares). The area was measured using a polar planimeter on a map of Jackson County at a scale of 1:253,440. The area of the floor of the Park is approximately 600 sq. mi. (1554 sq. km.).

The floor of North Park is relatively flat with an elevation range of 7900-8300 ft. (2408-2530 m.). The low topographic relief is broken most prominently by Owl Ridge and Peterson Ridge, which extend in a line generally from southeast to northwest across the center of the Park. Other areas of local relief include Pole Mountain in the southwest, Delaney Butte in the west and Johnny Moore Mountain in the east.

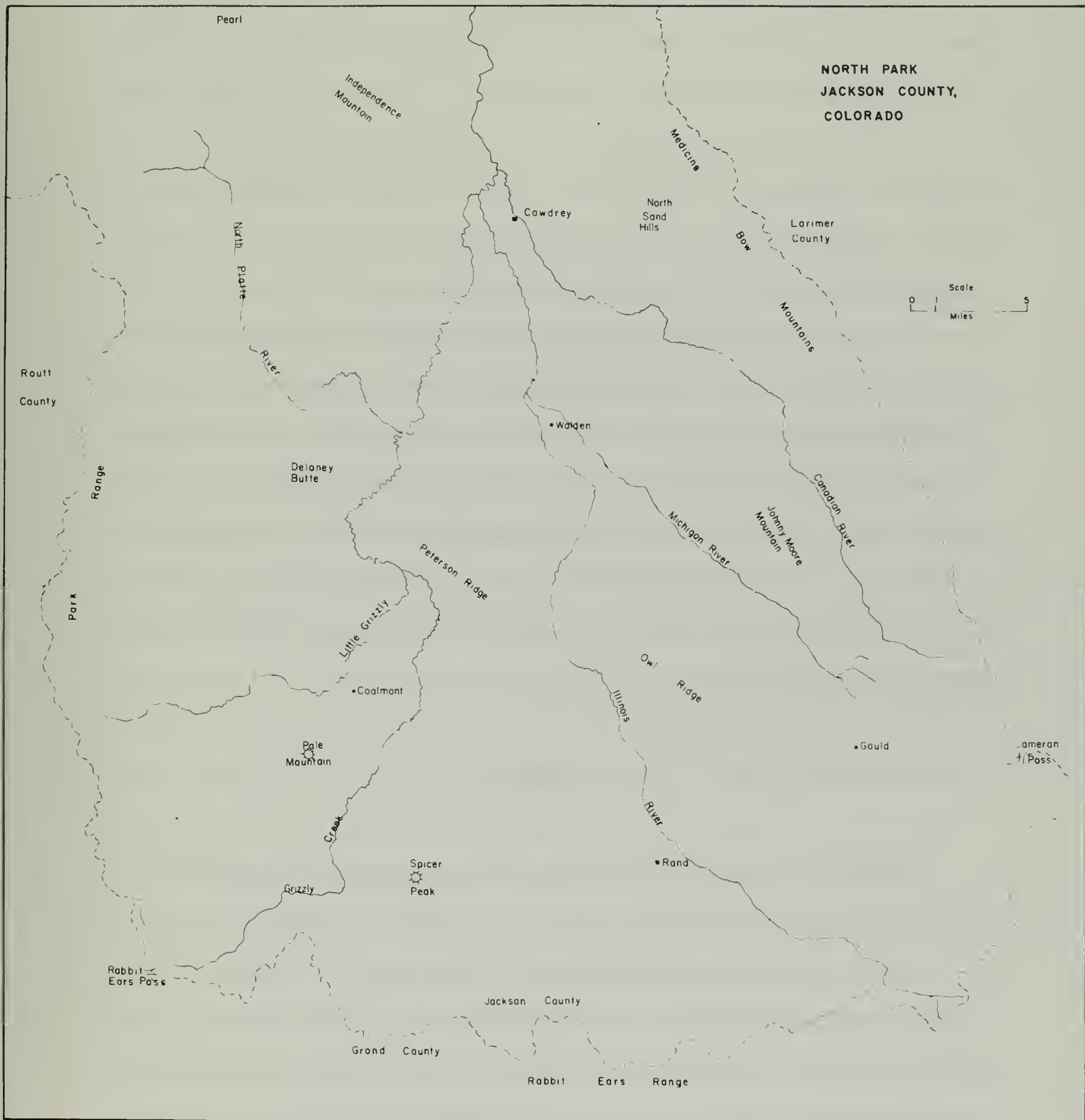

Figure 1. Major Natural and Cultural Features in North Park

There are several small depressions in North Park that contain small playas. These include Hebron Sloughs in the southwest and Case Flats north of Peterson Ridge in the center of the Park.

The major North Park tributaries of the North Platte - The Canadian, Michigan, Ilinois, Grizzly, Little Grizzly and North Fork Creek, together with the North Platte itself, form a dendritic drainage pattern over the Park floor with small gradients and a relatively high rate of meandering within the confines of floodplains, which average less than a mile wide. The stream gradients are essentially controlled by the geologic structure at Northgate, where the North Platte leaves the Park. The bedrock there is relatively hard and resistant to down-cutting. Consequently, stream downcutting and arroyo formation is absent in the Park at present. If, however, the North Platte were to cut through to softer bedrock at Northgate, the situation would change dramatically in the Park.

GEOLOGY

Geological information is relevant to archeology in several ways. Geological processes can have significant effects on archeological sites in terms of preservation and detection of those sites. Sites on floodplains where there is a rapid sequence of alluviation and down-cutting are not likely to last long. Sites in areas where there has been extensive alluviation or colluviation are likely to be buried and not visible on the surface. Slope wash alters the spatial association of surface artifacts on a site. A knowledge of the geology

of an area is also useful in identifying mineral, lithic and clay resources likely to have been used by prehistoric and historic inhabitants.

The Pre-Quaternary Geology

North Park is a structural basin between the Precambrian granites, gneisses and schists of the Medicine Bow and Park Ranges and Independence Mountain. The surface geology of the Park floor is dominated by the sandstones, conglomerates and shales of the Tertiary Coalmont Formation. Coal is found in the lower members of this formation (Hail, 1968). The North Park Formation overlies the Coalmont Formation and consists of white, calcareous conglomerates. It is exposed along a long, narrow syncline ridge trending northwest from Owl Mountain to the confluence of Roaring Fork and Grizzly Creeks. The syncline includes Owl Ridge and Peterson Ridge. Pierre Shale underlies the Coalmont Formation and is exposed primarily in the northwestern and northeastern quadrants of North Park.

Evidence of Tertiary volcanics is obvious along the southern boundary of the Park. Quantities of breccia and other volcanics are common in the Rabbit Ears Range in the form of dikes, sills, plugs, flows and ash. Because of the relatively resistant nature of the igneous rocks, several of these features can be clearly seen in the area today. Spicer Peak, for example, is apparently a monadnock which was formed as the result of igneous intrusion (Grout, et al., 1913). Other notable examples of this Tertiary activity are the numerous porphyritic

dikes exposed near Willow Creek Pass. Caves are another characteristic feature and are known to occur in eroded lava flows at the head of Arapaho Creek (Grout, et al, 1913). These caves may have been occupied prehistorically but the area has not yet been investigated.

The volcanic activity described above has resulted in the deposition of several rock types which are known to have been utilized by humans during the prehistoric past. Basalts are one of the more conspicuous occurrences in areas where dikes and volcanic plugs are exposed. Rhyolite is also present at several locations. Little Haystack Mountain, for example, in the southern part of the Park is a rhyolite intrusive (Hail 1968:60). Extensive rhyolitic flows are also recorded southeast of the Park in the vicinity of Cameron Pass (Spock 1928:215).

An outcrop of porphyritic obsidian was exposed in southeastern North Park during the cutting of the Michigan Ditch (Spock 1928). There are considerable amounts of impurities in this obsidian and the texture described by Spock is different from that of obsidian artifacts collected during the North Park Project. It is unknown if outcrops of the obsidian were exposed in prehistoric times. Until all of the lithic raw material outcrops mentioned above have been investigated by archeologists, it will be difficult to determine if any were actually quarried.

The current elevation of the Park and the divide between North and Middle Parks are the result of Tertiary activity. De la Montagne and Barnes (1957) have studied the size of volcanic rock types within deposits of the ancestral North Platte River and conclude from these

data that the principal drainage direction was from south to north as early as the Miocene. De la Montagne (1957) believes that streams in the area responded to Tertiary tectonic movements and regional uplift by increasing channel incision and by stripping older basin fill. Most of these streams were superimposed across underlying geologic structures.

The Quaternary Geology

Quaternary deposits in North Park are the result of both glacial and non-glacial processes. Pre-Wisconsin and Wisconsin glaciation is documented for several areas in the mountains surrounding the Park floor. Alluvial valleys adjacent to the meandering tributaries of the North Platte are conspicuous features in the area today. Alluvial fans, possibly formed during the pleistocene, have been recorded in northwestern North Park (Hail 1965).

Quaternary processes are particularly relevant to archeological research because of the influence they have had in forming the landscape immediately before and during the period of human occupation. In addition, quaternary evidence can provide clues to past environmental conditions, such as paleoclimates, which may have influenced human adaptations in the region. A general discussion of the known Quaternary geological events will be presented here. Attempts at reconstructing the paleoenvironmental situation in North Park are reserved for a later section.

Rising to elevations in excess of 12,000 ft. (3658 m.), the Park Range is an effective barrier to moisture-bearing winds and the

resultant condition is often a heavy cover of perennial snowfalls. Although no permanent fields of ice remain in the Park Range today, there is abundant evidence of Pleistocene glaciation (Atwood 1937). According to Atwood (1937), there were three periods of glaciation. He documents a single series of pre-Wisconsin glaciation only slightly larger than late Wisconsin events. He believes that the high mountain country of the Park Range was nearly covered by glaciation during the Wisconsin. He has identified evidence of seven glaciers east of the Continental Divide, which ultimately drained into North Park south of Independence Mountain (1937:126). Moraine deposits did not generally extend lower than 8500 ft. (2591 m.) and several have blocked drainages and formed lakes behind the deposits. Hail (1968) also recognizes extensive areas of lateral and terminal ridges formed by coalescing glaciers in the southern portion of the Park Range east of the Continental Divide and discusses several lakes or swamps in the resulting undrained depressions. Wisconsin glaciation is also present in the southeastern part of the Park as is evidenced by till and outwash along the Middle Fork of the Michigan River (Ward 1957). Cirque lakes are present in several areas of the Never Summer Range and other ranges beyond the boundary of the Peak (Spock 1928).

Gorton (1953) suggests that two stages of Pleistocene glaciation occurred in the vicinity of Cameron Pass. The first took place during pre-Wisconsin times and its deposits are generally confined to high terraces. The second glacial episode was during the Wisconsin and deposits from this glaciation occur in deep valleys. Boulders from the latter event are noticeably less weathered than those deposited during

pre-Wisconsin times.

Eschman (1955) documents the presence of four separate glacial events at the headwaters of the Michigan River. He refers to the first event as the Owl Mountain substage and considers it to be the earliest of the four. This stage lacks morainic form and is believed to be pre-Wisconsin in age. The Gould substage is the second of Eschman's series and it correlates to the early Wisconsin. Moraines are present for this substage. The third substage, the Silver Creek, is believed to be a middle or late Wisconsin glaciation. Extensive morainic deposits in excess of 100 ft. (30 m.) high are documented in the Never Summer Range for this substage. The fourth glaciation in this area is termed the American Lake substage. This glaciation has deposited fresh morainic debris near the headwaters of the Michigan River tributary system. Deposits of rhyolite and quartzite cobbles on Owl Ridge below Owl Mountain may be the result of early episodes of glacial activity in this area.

Eschman (1957:34) lists six major terrace levels along the Michigan River, ranging from 20 to 210 ft. (6 to 64 m.) above the present stream, which consist of rock-cut surfaces and gravel caps up to 10 ft. (3 m.) thick. These terraces are believed to be of Pleistocene age. He considers the possibility that they were formed as a result of an increased load in the Pleistocene drainage as a result of glacial melting. Gravels were then deposited during increased valley widening because the drainage channels could not maintain velocity or incise into underlying deposits due to the gradient control exercised by the fault block at Independence Mountain. Remnants of graded Pleistocene

sediments are common features in the general area (York 1957). Hail (1965) has correlated the relative ages of Park Range and Michigan River Basin glaciations.

The Canadian River has also been affected by Pleistocene glacial events. The river course is believed to have been moved westward in one area by the advance of valley glaciers descending from nearby canyons (York 1957).

Of all the mountain ranges surrounding North Park, the Rabbit Ears Range has been perhaps the least affected by Pleistocene glaciation. The only real evidence for glaciation there is in the upper valley of Arapaho Creek (Ott 1949:15). Several lakes can be seen in this region that may be the result of retreating glacial ice.

Ott (1949) describes mesa-like, interfluvial terraces occurring at two distinct levels in the park which indicate to him different periods of base-leveling. The upper level is at an elevation of approximately 8300-8400 ft. (2530-2560 m.) and is believed to be the remnant of an early Quaternary base-leveling episode. The second terrace level is 50-60 ft. (15-18 m.) below the first.

In sum, there was significant glacial activity in North Park during the Pleistocene. Fluviatile gravels, interfluvial terraces and Pleistocene pediments are examples of the influence of high altitude Quaternary activity upon the current landscape of the Park floor.

There is considerable evidence for other nonglacial Quaternary features in North Park (Scott 1965). Fine-grained alluvium, some of which reaches thicknesses of 30 ft. (9 m.), and wind blown sand are good examples of these features. Dune fields along the east-central (East

Sand Hills) and northeastern (North Sand Hills) border of the Park floor are migrating eastward as a result of prevailing southwesterly winds. Beekley offers a viable reason for this prevailing wind direction:

> "The comparative lowness of the park wall from Rabbit Ears Peak to Arapaho Pass may admit stronger winds from this opening in the park wall, a theory that is borne out to some extent by statements of ranchmen that the region northeast of Walden is often swept comparatively clean of snow when other sections of the field are deeply covered (1915:73)."

C^{14} dates suggest a relatively late date of formation of the North and East Sand Hills. A date of 2830 $\pm$200 years BP was obtained for a peat layer in the alluvium beneath dune sand along North Sand Creek and a date of 2110 $\pm$200 years BP was obtained for peat in the alluvium beneath dune sand along East Sand Creek. A tree buried by dune sands and recently exposed west of the present major dune slipface in the North Sand Hills was C^{14} dated to 1250 $\pm$200 years BP (Ahlbrandt and Andrews 1977:6).

Wind action may also be responsible for other Quaternary features in North Park. Grout, Worcester and Henderson (1913:16) suggest that several lakes formed in the vicinity of the Rabbit Ears region could be the result of several different factors, one of these being the formation of shallow lakes in basins originally formed by wind. It is possible that the Hebron Sloughs depression consists of one or more wind deflation depressions. Another possibility is that they represent remnants of a larger, Pleistocene lake that was formed by aggrading gravels during the last deglaciation which effectively blocked any

outlet (Madole, personal communication 1979).

THE CLIMATE OF NORTH PARK

The climate of North Park is influenced by the surrounding mountain ranges, which are effective rainfall barriers. Marked contrasts in microclimate occur within the Park due to variations in slope exposure and elevation. The central and lower portions of the Park are classified as cool, summer desert which grades into a semi-arid transition zone below the humid upper slopes of the mountains. Due to protection provided by the mountains and the prevalence of warming Chinook winds, the average annual range of temperature is somewhat less than would be expected for this latitude and elevation (Ott 1949). Temperature data for Spicer, located in the southwestern part of the Park at an elevation of 8700 ft. (2652 m.), and Walden, located in the center of the Park at an elevation of 8050 ft. (2454 m.), have been compiled by Martin (1930) and are presented in Table 1. These were recorded around the turn of the century. An 18 year average annual temperature of 36.7°F (2.6°C) was recorded at Spicer and 37.8°F (3.2°C) at Walden. An average temperature of 37.4°F (3.0°C) was recorded at Walden in 1968 (U.S. Dept. of Commerce 1968). The average date for the last killing frost in the spring at Walden is July 6th and June 30th at Spicer (Martin 1930:20). August 31st is the average date of the first killing frost in autumn at Walden. The average first killing frost at Spicer occurs on August 28th. The relatively short frost free season, which averages about 65 days, inhibits any form of agriculture today

TABLE 1

TEMPERATURE DATA ON JACKSON COUNTY[4]

Station	Length of Record (years)	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Average Temperature														
Walden	6	16.5	19.2	25.4	35.8	46.8	54.5	59.5	59.0	51.0	39.2	30.2	15.6	37.8
Spicer	18	17.4	20.8	24.4	34.9	43.4	52.8	58.8	56.6	48.8	38.1	27.8	16.7	36.7
Average Maximum Temperature														
Walden	6	29.5	31.6	38.3	50.1	64.0	73.5	79.5	78.1	70.1	55.8	44.9	28.5	53.7
Spicer	18	30.7	33.8	38.5	49.3	58.8	70.6	77.5	74.7	66.5	53.6	41.6	29.4	52.1
Average Minimum Temperature														
Walden	6	3.5	6.9	12.5	21.5	29.6	35.5	39.5	39.8	31.8	22.7	15.5	2.7	21.8
Spicer	19	4.2	7.7	10.2	20.5	27.9	35.1	40.0	38.4	31.0	22.6	14.0	4.0	21.3

[4]Data (in degrees Fahrenheit) from Martin (1930:19).

except the cultivation of hay by irrigation in and near the floodplains. Assuming a similar climatic regimen in the recent past, any agriculturally based prehistoric occupation is extremely unlikely.

Most of the precipitation in North Park falls as snow during the winter. Precipitation is lowest at the center of the Park and increases towards the margins (cf. Figure 2). Martin (1930) has compiled climatic data for three communities - Walden, Spicer and Pearl. Pearl is located in the north end of the Park at an elevation of 8500 ft. (2591 m.). The precipitation data collected by Martin are presented in Table 2. These data indicate considerable increase in precipitation at higher elevations. Pearl yielded an average annual precipitation of 22.41 in. (569 mm.) with over 46% of the precipitation falling within the four month period between January and April as snow. The average annual precipitation at Spicer during the recording period was 11.06 in. (281 mm.) with highest average monthly precipitation occurring from July through October. Precipitation at Walden was lowest, with an average of 9.01 in. (229 mm.) The highest average monthly averages at Walden were March, April, May and August during the recording period. A much higher average annual precipitation of 14.3 in. (363 mm.) was recorded at Walden in 1968 (U.S. Dept. of Commerce 1968).

Winters in North Park are relatively severe relative to other areas of human occupation in the U.S. today. Seventy percent of the annual precipitation falls as snow. Walden averages about 53 in. (1346 mm.) of snow per year, Spicer averages about 82 in. (2083 mm.) and Pearl gets about 169 in. (4293 mm.) of snow per year (Ott 1949). Cattle generally cannot be wintered in the Park without supplemental feeding.

Figure 2. Annual precipitation pattern in North Park.

Table 2

PRECIPITATION IN JACKSON COUNTY
MONTHLY, ANNUAL AND AVERAGE AMUUNTS[2]

Pearl													
Year	January	February	March	April	May	June	July	August	September	October	November	December	Annual
1910	3.85	3.50	2.00	1.38	----	----	----	----	----	1.07	0.25	0.03	-----
1911	4.20	2.85	.80	1.80	0.65	1.50	0.95	1.21	0.90	1.14	3.90	.20	20.10
1912	1.80	2.20	2.50	1.30	1.21	.56	2.37	1.03	2.42	2.25	1.40	2.77	21.81
1913	5.50	6.60	8.40	5.40	.16	.64	2.09	.27	1.04	3.63	2.59	2.00	38.32
1914	5.19	2.96	1.74	3.76	2.96	1.68	*.70	.10	1.12	1.94	.10	.75	23.00
1915	1.83	1.15	1.11	.84	1.59	1.93	.69	2.02	2.95	1.40	1.89	1.28	18.68
1916	3.20	1.84	1.67	1.41	2.01	.20	.83	2.77	2.22	2.31	1.82	2.30	22.58
1927	----	----	----	----	----	----	----	----	----	----	2.14	1.57	-----
1928	----	----	----	----	----	1.59	1.59	.78	.76	1.97	1.04	.93	-----
1929	0.03	2.11	2.73	*2.83	2.60	1.21	2.06	1.89	3.02	1.82	.66	.58	22.54
1930	1.55	1.46	1.39	.11	.82	.57	1.54	3.49	1.98	.89	1.42	.05	15.27
Ave.	3.13	2.74	2.48	2.09	1.50	1.10	1.42	1.51	1.82	1.84	1.56	1.22	22.41

[2]Data (in inches) from Martin (1930:15-16). T = less than 0.01 inch. * = estimated from surrounding stations.

Table 2
(Continued)

PRECIPITATION IN JACKSON COUNTY
MONTHLY, ANNUAL AND AVERAGE AMUUNTS[2]

Walden													
Year	January	February	March	April	May	June	July	August	September	October	November	December	Annual
1887	----	----	----	----	----	----	----	----	----	----	----	----	-----
1888	0.151	1.29	1.05	2.25	1.93	0.30	1.45	1.93	.07	1.15	----	0.25	-----
1889	0.12	.48	----	----	----	----	----	----	----	----	----	----	-----
1897	.56	.34	1.99	.90	----	.89	.93	1.06	.70	.31	0.45	.50	-----
1898	.20	.17	1.14	2.37	2.08	1.03	.51	.53	.04	.47	----	.24	-----
1899	1.17	1.74	1.36	.86	.30	.38	1.05	1.09	----	----	.13	.89	-----
1900	.21	.72	.26	1.87	.92	.29	.11	.48	.90	.10	.23	.33	6.42
1901	.14	.35	.58	1.77	1.32	1.31	.33	2.44	.05	.04	.52	.61	9.46
1902	.17	.18	1.00	.43	.45	.30	1.04	----	----	----	----	----	-----
1903	----	----	----	----	----	----	----	----	----	----	----	.07	-----
1904	.17	.16	----	----	.68	.91	1.01	2.79	.83	.26	T	.31	-----
1905	.35	.56	.60	1.09	----	----	----	----	----	----	----	----	-----
Ave.	.31	.60	1.00	1.44	1.10	.68	.80	1.33	.49	.39	.47	.39	9.01

[2]Data (in inches) from Martin (1930:15-16). T = less than 0.01 inch. * = estimated from surrounding stations.

Table 2

(Continued)

PRECIPITATION IN JACKSON COUNTY

MONTHLY, ANNUAL AND AVERAGE AMUUNTS[2]

Spicer													
Year	January	February	March	April	May	June	July	August	September	October	November	December	Annual
1909	----	----	----	----	----	----	----	----	----	----	----	----	-----
1910	0.71	0.48	0.16	0.59	1.31	0.13	1.69	0.38	1.60	*0.13	.13	.44	8.44
1911	1.09	1.17	.48	1.44	.33	.94	1.04	1.32	.96	1.00	1.17	.16	11.20
1912	.70	.88	1.49	.34	.72	3.30	2.19	1.30	2.48	.86	.50	.65	15.41
1913	.75	1.53	.37	T	.63	.91	1.72	.75	1.23	.69	.97	.71	10.26
1914	2.11	.21	.48	.32	.92	.76	1.82	1.09	.80	1.69	.01	.34	10.46
1915	.73	.56	.32	.39	1.29	2.20	T	1.94	1.81	.36	1.00	.44	11.04
1916	1.10	.49	.46	.11	1.78	T	1.66	1.98	2.08	.87	1.07	1.34	12.94
1917	.01	.30	1.20	1.68	3.12	.01	1.37	.31	.25	.57	.39	.71	9.92
1918	1.16	1.36	.42	.96	.07	.53	1.47	.81	1.37	*2.31	*.50	.54	11.48
1919	.00	.25	.50	.53	.02	T	.57	.38	.99	2.25	2.56	.64	8.69
1920	.20	1.33	1.08	3.61	.08	.04	.10	1.28	.13	1.21	.53	1.00	10.59
1921	.87	.63	1.12	.85	.12	1.13	1.27	1.01	.61	.60	.57	1.09	9.87
1922	.81	.84	.36	.21	.07	.03	.13	.64	.46	.57	.70	2.18	7.00
1923	.75	.55	1.70	.73	.13	1.29	1.00	1.12	.51	1.54	.31	.80	10.43
1924	.60	.10	1.14	.40	2.10	.10	.81	T	.96	3.44	1.15	1.03	11.83
1925	.54	.37	.40	T	.74	2.25	1.13	2.47	1.55	2.01	.25	.76	12.47
1926	.46	.43	.61	1.66	2.20	.00	1.48	2.00	.02	.91	.85	.72	11.34
1927	.77	2.38	1.06	1.35	.90	.79	.28	1.63	2.00	2.71	.94	1.07	13.88
1928	.42	.17	1.38	.48	1.92	.83	.48	.56	.42	1.48	1.15	.70	9.99
1929	.65	.89	.97	.67	.69	.45	1.87	1.58	3.01	.86	.38	.11	12.13
1930	1.23	1.15	.67	.32	.16	.21	1.95	2.98	1.04	.72	1.70	.20	12.33
Ave.	.75	.77	.78	.79	.87	.76	1.10	1.22	1.16	1.31	.82	.73	11.06

[2]Data (in inches) from Martin (1930:15-16). T = less than 0.01 inch. * = estimated from surrounding stations.

While the picture of the past climates in North Park is not well known, there is good evidence for significant climatic variation in the Southern Rocky Mountain region during the Holocene. Benedict (1975a) outlines a sequence of climatic changes from about 12,000 B.P. to the present which is based on geomorphological and palynological evidence obtained along the Front Range of the Southern Rocky Mountain region. He has pointed out, however, that conditions in North Park may have been somewhat different than those along the Front Range and argues against a strict application of his sequence to North Park (personal communication 1979). There is little other information available at present that could be used to reconstruct past climatic conditions in the Park. Richard Madole of the U.S. Geological Survey recently took an auger soil sample in the Hebron Sloughs basin above the present water table (personal communication). The first 50 cm. of the test yielded clay which indicates to him that the sediments in the basin are lacustrine in origin. Also, the Soil Conservation Service has described the basin soils as strongly alkaline (Fletcher 1981), which indicates that relatively stagnant water once occupied a large portion of the basin. The presence of a lake in the Hebron Sloughs depression may be indicative of a wetter climate, probably in immediate post-Pleistocene times, or it may have solely been a result of the proposed damming up of the basin during the same period. In any case, an extensive coring program in the Hebron Sloughs and Case Flats area, with analysis of the soils, pollen and microfossils obtained from those cores, would be of significant help in reconstructing past environmental conditions of North Park.

THE FLORA OF NORTH PARK

One of the primary problems dealt with in the present study is the proportion of vegetal foods in the diet of prehistoric inhabitants of North Park. This requires a knowledge of the distribution of plant communities in the Park. It is important to keep in mind, however, that present vegetational patterns are probably different than in prehistoric times. Lacking reliable data concerning past environments, information on present day vegetational patterns has been used in the analysis. The results obtained from the site catchment analysis indicate that, while the composition of vegetational communities may have changed through time, characteristics such as the productivity of certain classes of plants on given soil types approximate prehistoric patterns. This will be explained more fully in Chapter 8.

The natural vegetation of an area can be classified in several different ways and with varying degrees of generality. Armstrong (1972:5), for example, identifies six vegetational communities in North Park: sagebrush steppe, montane forest, sub-alpine forest, meadow, streamside thicket, and tundra and talus. A large part of the Park floor is covered by sagebrush and sparse grasses. The bottomlands along he streams support stands of willow, grass and other herbaceous plants. Lodgepole pine forest and aspen groves interspersed with meadows are found on the lower mountain slopes, while heavier forest stands of lodgepole, Englemann spruce and firs are found on the higher mountain slopes.

Floodplain vegetation communities have been modified during the last 90 years by the irrigation of hay fields. Approximately 20 percent of the Park floor has been brought under irrigation at some time (cf. Figure 3). Irrigation was so intense during the early years that more land was brought under irrigation than could be maintained by available natural water sources (Davis 1937:379). Consequently, the amount of irrigated land in North Park was reduced during the three decades prior to Davis' work in 1937, leaving abandoned ditches which are still visible today. The area is widely known for the quality of its native hay crop and the principal constituents of the crop are native grass species. According to Marvin Fuqua (personal communication 1978), a local stockman, the principal hay grasses are clover, timothy, brome and redtop.

The fact that native hay is preferred suggests that irrigation has affected the density and distribution of vegetation on the floodplain more than it has affected the species composition of particular communities. The native species that were available along streams prehistorically may be the same as those found there today, though the stands are no doubt denser due to artificial modifications of the water supply. Ranching activities in the Park have also impacted the distribution of other floral species. The dispersal of at least two species of sagebrush (*Artemisia tridentata* and *A. frigida*) has increased since the latter part of the 19th century due to grazing pressure (Costello 1964) but probably not as much as is popularly believed. Photographs of the Walden area taken at about the turn of the century, for example, show that the distribution of sagebrush then was similar to

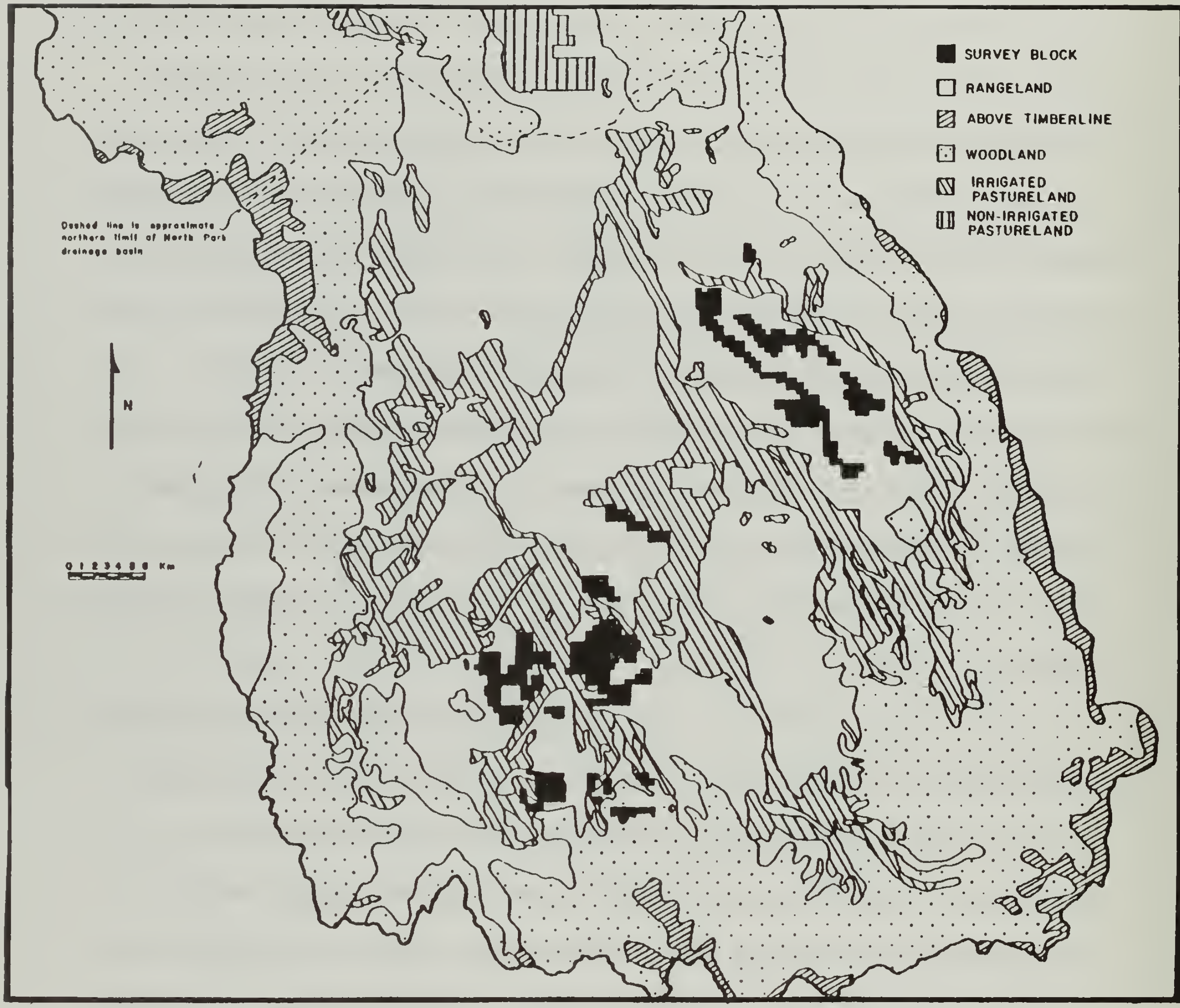

Figure 3. Distribution of survey areas in relation to major resource use zones.

that of today.

The Soil Conservation Service uses the range site concept to classify plant communities, and a potential natural vegetation map of Jackson County has recently been published by the SCS (Map M7-E-23444-29). Range site data for North Park have been derived from soil surveys of the park (Fletcher 1981). According to the authors of this report:

> "Soils that have the capacity to produce the same kinds, amounts and proportions of range plants are grouped into range sites. A range site is the product of all environmental factors responsible for its development (Fletcher et al. 1981:63).

This report provides the most complete and reliable data currently available on the vegetative composition of North Park and it is these data that were used in this study. It is important to note that the range site characteristics exclude any plants known to have been introduced historically by human agents.

Fletcher (1981:63-74) defined 15 range sites and two forest types for Jackson County. Each of these sites has been investigated by the SCS and found to contain vegetation that is significantly different in composition and/or density than the vegetation in any other range site (Ken Lutz, personal communication 1978). For this study, the forest types were combined to form a Woodland zone. Also defined for this study was a Rock-Badland zone which included all areas in which no natural vegetation occurs. The main characteristics of the range sites

are presented in Table 4 and acreage in Table 3.

Potential Wild Plant Foods

The total edible biomass of a range site is that proportion of the total annual floral dry weight production of each range site that was of potential food value to prehistoric populations. This total can also be broken down into the edible biomass of grasses, forbs and shrubs to see if there was any difference in selection of edible plant classes between site types or prehistoric periods. There are other potential uses of plants, such as fuel and medicinal uses, but these were not considered in the present study.

The SCS North Park soil survey report presents the range between good and bad years of the total annual dry weight production of each range site in lbs./acre/year (Fletcher 1981:63-74). The averge of the high and low figures was taken to represent the average annual total biomass of each range site. The SCS report also lists the percent composition by weight of the principal species in each range site. Potential edible species were identified by consulting Yanovsky (1936), Harrington (1967) and data provided by the Plant Information Network (PIN) of Colorado State University. This procedure sounds simple on paper but was complicated by the fact that the SCS report lists only common names of species. Also, there was sometimes a lack of agreement between the sources consulted. For example, Sedum spp. is mentioned by Harrington (1967) as edible, by the PIN as questionably edible, and is not mentioned at all by Yanovsky (1936). In such cases, the particular

TABLE 3

APPROXIMATE ACREAGE AND PROPORTIONAL EXTENT
OF RANGE SITES IN NORTH PARK*

Range Sites	Hectares	Percent of Total
Woodland	59,347	20.5
Alpine Slopes	2,990	1.0
Stony Loam	695	0.2
Subalpine Loam	3,227	1.1
Mountain Loam	16,607	5.8
Mountain Shale	9,110	3.2
Deep Clay Loam	5,146	1.8
Rocky Loam	13,087	4.5
Dry Mountain Loam	28,917	10.0
Valley Bench	46,086	16.0
Bald Slopes	21,840	7.6
Claypan	6,324	2.2
Mountain Meadow	30,474	10.6
Alkaline Slopes	2,309	0.8
Salt Flats	10,543	3.7
Sandy Bench	9,555	3.3
Barren Areas		
Randman Sandy Loam	7,552	2.6
Eachuston Gravelly Loam	1,933	0.7
Walden Sandy Loam	3,853	1.3
Rock Outcrop and Gravel Beds	3,689	1.3
Rockland	2,351	0-.8
Bandland	543	0.2
Dune Land	487	0.2
Mine Pits and Dumps	324	0.1
Water	1,530	0.5
Total	288,518	100.0

* Data compiled from Fletcher et al. (1977:40-44).

TABLE 4

MAJOR CHARACTERISTICS OF RANGE SITES IN NORTH PARK

Range Site Name	Setting	Slope %	Primary Vegetation	Comments
Alpine Slopes	Mountain slopes above timberline		Tufted hairgrass, bluegrasses, kobresia, forbs	Not present in study area
Stony Loam	Hillsides	20-40	Bluebunch wheatgrass and other grasses, sedges, serviceberry, sagebrush	Not present in study area
Subalpine Loam	Open parks in spruce-fir zone	0-20	Fescues, wheatgrasses, sagebrush	
Mountain Loam	Edges of valley floors, toeslopes of hills	2-20	Fescues, wheatgrass, sagebrush	
Mountain Shale	Rolling hills	5-20	Wheatgrasses, muttongrass, sagebrush	
Deep Clay Loam	Mountainsides	5-15	Wheatgrasses, fescues, sagebrush	
Rocky Loam	Hillsides	0-45	Wheatgrasses, Indian ricegrass, fescues, sagebrush	
Dry Mountain Loam	Rolling topography	0-25	Streambank wheatgrass, sheep fescue, muttongrass, sagebrush	Most extensive
Valley Bench	Benches and uplands	0-30	Wheatgrass, muttongrass, junegrass, sagebrush	Scrubby big sagebrush aspect
Bald Slopes/Dry Exposure	Ridgetops	10-70	Wheatgrasses, junegrass, needle and thread	Very droughty, stunted growth
Claypan	Rolling topography over shale	3-15	Streambank wheatgrass, junegrass, muttongrass	Shallow-rooted plants
Mountain Meadow	Along streams	0-5	Thurber fescue, tufted hairgrass, willow	Highest productivity, subirrigated
Alkaline Slopes	Sloping benches and uplands	2-10	Wheatgrass, saltgrass, Indian ricegrass, sagebrush, greasewood	Shallow soils over shale
Salt Flats	Floodplains, adjacent to drainageways	0-5	Western wheatgrass, saltgrass, greasewood	
Sandy Bench	East side of Park next to mountains	1-10	Wheatgrasses, reedgrass, muttongrass	

genus was not counted in the edible biomass of a range site. Also, information was not available for roots, bulbs and tubers. While these factors have undoubtedly reduced the accuracy of the biomass data, their use in the settlement system analysis has revealed clear patterns of plant food utilization.

Not all of the dry weight of a potentially edible plant is usable as food. Based on information provided by Harper (1977) and Robert Bye of the Biology Dept. at the University of Colorado (personal communication 1979), 25% of the total biomass of edible grasses and forbs and 2% of the total biomass of edible shrubs was considered as edible.

A list of edible species and genera and associated percentage compositions and dry weights is presented in Appendix A. The edible biomass of grasses, forbs and shrubs and the total edible biomass is presented in Table 5 for each of the range sites (including Woodland) used in the analysis.

THE FAUNA OF NORTH PARK

According to early historic reports, North Park was remarkable for the quantity of game found there and this was undoubtedly an attractive feature of the Park for prehistoric populations.

The fauna of North Park is rich and diversified, with over 60 species of mammal occurring in Jackson County. The richest single community types are the montane and sub-alpine forests, and alpine communities are lowest in species abundance (Armstrong 1972:3). The Park also has an abundance of waterfowl of various kinds at certain

TABLE 5

EDIBLE BIOMASS
FOR INDIVIDUAL RANGE SITES AND WOODLAND

Range Site	Edible Biomass, kg/hectare/yr			
	Grasses	Forbs	Shrubs	Total
Subalpine Loam	420.0	92.4	10.1	522.5
Mountain Loam	231.0	8.4	8.4	247.8
Mountain Shale	65.8	8.4	2.2	76.4
Deep Clay Loam	280.0	28.0	11.6	319.6
Rocky Loam	119.2	13.3	3.8	136.3
Dry Mountain Loam	85.2	20.3	3.2	108.7
Valley Bench	98.5	5.5	2.6	106.6
DML/VB*	91.8	12.9	2.9	107.6
Bald Slopes	44.2	3.0	1.2	48.4
Clay Pan	61.8	6.0	4.3	72.1
Mountain Meadow	394.8	25.2	10.1	430.1
Alkaline Slopes	42.0	0	2.8	44.8
Salt Flats	78.3	0	2.3	80.6
Sandy Bench	100.0	20.0	3.0	123.0
Woodland Understory	14.0	2.7	1.8	18.5
Rock/Badland	0	0	0	0

* Dry Mountain Loam/Valley Bench; edible biomass calculated as average of two prior range sites.

seasons due to its location at the northern limit of waterfowl wintering grounds of the Central Flyway of the Rocky Mountains (Johnson 1955:37). Several animal species were formerly abundant enough to present the possibility of their regular, planned exploitation by prehistoric hunters. For purposes of predicting possible patterns of use, these are divided into two general categories: 1) migratory animals, including large game mammals such as bison, elk, mule deer and antelope, and migratory waterfowl; and 2) non-migratory animals including beaver, sage grouse, prairie dog, marmot, rabbit and ground squirrel.

Migratory Animals

BISON

Two sub-species of bison appear to have formerly inhabited the area of northern Colorado; the Northern Bison (*Bison bison septemtrionalis*), which ranged from the valley of the North Platte northward to eastern Montana and westward to the foothills of the Rocky Mountains; and the Mountain Bison (*B. bison haningtoni*), now extinct, which appears to have been restricted to the higher mountain parks of Colorado (Warren 1942:296). While there is disagreement as to the exact differences between these two sub-species, the mountain bison appears to have been in the same general size range as the plains bison, though it is described as being somewhat smaller, less gregarious and more wary than the plains bison.

The mountain bison are reported to have been very shy, rarely found

in herds except in the fall, and seldom seen otherwise except in small groups (Roe 1951). Dary (1974:46) quotes an 1840 account of hunting mountain bison: "...one may hunt for days without discovering more than one band of half a dozen." The animals are described as:

> "...inhabiting the deepest, darkest defiles or the craggy, almost precipitous sides of the mountains, inaccessible to any but the most practiced mountaineers." (Roe 1951)

The mountain bison ranged the high mountain valleys to timberline and above, and are thought to have freely crossed the higher passes and mountain ranges separating North, Middle and South Parks at elevations generally between 11,000 ft. (3356 m.) and 12,000 ft. (3658 m.). In the 1870's a small herd near Pikes Peak is reported to have regularly crossed a divide at approximately 12,000 ft. (3658 m.), though no reason is given for the crossings (Warren 1942:297). During most of the year, the bison utilized the higher meadows for feeding in the mornings and evenings, hiding in the surrounding forests during much of the day (Roe 1951:36). While there is little information concerning seasonal behavior of the mountain bison, they are generally thought to have wintered in the lower, more sheltered areas of parks and surrounding valleys (Warren 1942:297). Thus the fall rutting season and possible winter concentrations in the more sheltered areas would be the times when herding might have been expected; a highly dispersed population in relatively inaccessible areas seems to have characterized behavior at other times.

Plains bison are also known to have seasonably inhabited many of the higher mountain peaks, utilizing all of the major rivers entering the plains along the front range of the Rockies as major access routes to the abundant food and protection from climatic extremes provided by these areas. The favorability of North Park to these herds is indicated by early references to the park as the "Bull Pen," due to their traditional abundance (Roe 1951:554). Plains bison were more or less migratory, but these migrations were apparently in search of feeding grounds rather than a definite movement with the changing seasons (Warren 1942:298). While fluctuations in the population density of bison within the Park would be correlated with changes in forage abundance, evidence indicates that at least some of the animals might be expected to have been in the Park during most of the year (Roe 1951; Dary 1974).

Roe (1951:549) is of the opinion that the major mountain parks served as winter range for segments of the immense plains herds. Several early accounts seem to confirm this assumption. Ashley, for example, observed herds of bison while travelling up the North Platte on the 17th of March, 1825. While on the east slope of the Medicine Bows, he comments:

> "As I thus advanced, I was delighted with the variegated scenery presented by the valleys and mountains, which were enlivened by innumerable herds of buffaloe, antelope, and mountain sheep grazing on them." (Dale 1918:132-33)

Fall was the rutting season for both the mountain and the plains

bison, with calves born in early spring. Bison attained their greatest weight and best physical condition in late summer and fall, which appears to have been a major period of exploitation by primitive hunters (Roe 1951; Dary 1974). The average weight of mature male bison is estimated at 1800 lb. (816 kg.) and that of females at 800 lb. (363 kg.). Amounts of usable meat per animal are estimated at 900 lb. (408 kg.) for males and 400 lb. (181 kg.) for females (White 1953:397).

ELK (*CERVUS CANADENSIS*)

As an indication of the potential elk population in areas of preferred habitat in Colorado, modern estimates from 14 areas within the state yielded an average estimate of 5 elk per square km. (Carhart 1940:31). These estimates, however, are not meant to be representative of elk habitat as a whole. Seton (1929) estimated that in 1897 the elk population of Yellowstone National Park was 50,000, or 4 per square km. His estimate of the average population density for all American elk habitats in prehistoric times was placed at 1.5 animals per square km.

The year round behavioral patterns, habitat, and food preferences of elk in the western United States do not vary greatly from region to region. Winter range is normally in valley bottoms, lower portions of narrow tributary canyons, and low hillsides, where elk congregate in herds ranging in size into the thousands, with males and females in random association (Yeager 1970). Elk movements in Colorado between summer and winter range are generally considered to be only shifts in elevation, with long or pronounced migrations seldom being observed.

While the bulk of the elk herds migrate between summer and winter range, a considerable number are known to stay year round on one range in all areas where such data is available (Yeager 1970). Numerous cases of elk, mostly bulls in groups of up to 20 head have been reported wintering at elevations of between 7540 ft. (2300 m.) and 8530 ft. (2600 m.) in Yellowstone National Park (Skinner 1925:185) and above 8200 ft. (2500 m.) in Rocky Mountain National park (Bowes 1954:29). In these cases, they were generally found on wind-blown, southern exposures where little snow accumulated and appeared to remain in good condition throughout the winter.

The summer range of elk may be considered to include roughly most areas of 8530 ft. (2600 m.) elevation and above, and is characterized by large, open parks which support a wide variety of grasses and other herbaceous plants, surrounded by dense stands of spruce-fir forest and scattered to extensive stands of aspen (Yeager 1970:s0). Within North Park, favored elk habitat on the summer range is within the sub-alpine forest, meadow and tundra community types. Elk prefer to graze on grasses when available, with browse making up only 10-20% of their diet when grasses and other herbaceous plants are available. When preferred forage has been depleted or is covered by snow to a depth at which it is unattainable, elk may subsist on a diet composed of from 60-90% browse (Gaffney 1941:441).

By late summer, elk reach their peak physical condition, with mature males weighing up to 700 lb. (320 kg.) and females somewhat less. New calves average around 250 lb. (113 kg.) on the summer range, while yearlings average 350 lb. (159 kg.). White (1953:397) estimates that an

average of 350 lb. (159 kg.) of usable meat is provided by a mature elk.

MULE DEER (ODOCOILEUS HEMIONUS)

Mule deer population estimates in areas of high quality habitat in Colorado vary from 2 to 136 per square km. with 10 to 20 animals per square km. being the most frequent number (Carhart 1940:22-27). These estimates are from some of the more favorable areas and are not representative of the total deer habitat. Russell, for example, estimated the average mule deer population density in Yellowstone National Park at 1.7 animals per square km. (1932:5) and Seton (1929) estimated the average population density in western North America in prehistoric times to be about 1.5 per square km.

The elevation of mule deer winter range in the area of North Park varies between 5500 ft. (1676 m.) and 9000 ft. (2743 m.). During periods of heavy snow and low temperature, the main herds usually remain at lower elevations below 7000 ft. (2134 m.). During mild winters, the herds tend to remain near the upper limit of the winter range, often remaining around 8000 ft. (2438 m.) unless driven down by a sudden storm (Harris 1958). Herds often numbered into the thousands in wintering areas such as the Cache la Poudre Valley (Bowes 1957).

On the winter range, the deer seek out sheltered, timbered areas to rest, feeding either in wind-blown areas which are free of snow or venturing into deep snow to take advantage of drooping limbs. Sagebrush, aspen and willows are among the plants most commonly consumed on winter range, with sagebrush probably the most valuable winter range

species in the central Rocky Mountain region due to its availability and high nutritive content (Yeager 1960).

On the summer range, mule deer are seldom encountered in groups larger than two or three individuals, with the sexes generally remaining separate. Miscellaneous forbs and grasses make up the bulk of the forage on summer range in northern Colorado (Yeager 1970). The greatest weight is attained in late summer, with adult males weighing up to 400 lb. (181 kg.) and females averaging 100 lb. (96 kg.). The averaged dressed weight of an adult male is 212 lb. (96 kg.) and that of a female is 130 lb. (59 kg.) (Hay, et al. 1961). The average mule deer is estimated to provide about 10 lb. (45 kg.) of usable meat (White 1953).

Mule deer utilize a wide range of habitat within North Park, including sagebrush steppe, montane forest, sub-alpine forest, streamside thicket and tundra communiy types (Armstrong 1974:5).

ANTELOPE (ANTILOCAPRA AMERICANA)

The range of the Pronghorn Antelope was more extensive in prehistoric times than that of the bison, being found in Colorado throughout the plains east of the foothills, in all of the large mountain parks, and in many other areas where conditions were suitable (Wallace 1940). Early references attest to large numbers of antelope in and around North Park in the late 1800's:

> "I have nowhere found Antelope so abundant as they were in the North Park in the summer of 1876. They were almost

> continually in view, and thousands must breed in that locality." (Warren 1942:291)
>
> "For ten or twelve miles in Cache la Poudre Valley, and all of the way west of the train, about three quarters to one half a mile away, was one lone band of Antelope, practically continuous and huddled together for warmth. Their numbers changed the color of the country." (Warren 1942:291)

Evidence that large numbers of antelope sometimes wintered in North Park is found in an 1885 account of a herd estimated at 5000 animals, which spent the winter near Walden (Warren 1942:291). Indications as to the potential to primitive hunters provided by these large herds is seen in an account in which Ute Indians, using a surround technique, killed 4400 antelope in the Park in 1868 (Warren 1942:291).

Antelope may exhibit seasonal migrations between summer and winter range which vary greatly with locale, some herds migrating long distances, others not at all or only locally witihin a defined area (Anthony and McSpadden 1971). Natural barriers apparently present no problems to antelope migrations, large herds having been known to cross the highest passes and mountain ranges separating the large mountain peaks (Tileston 1958). As with elk and deer, antelope movements are largely dependent on snow conditions and thus may show sharp differences from year to year. Many antelope within the major mountain parks are apparently non-migratory during most years, exhibiting only vertical seasonal movements between 7000 ft. (2134 m.) and 10,000 ft. (3048 m.) (Hoover, et al. 1959:13).

While most game species thrive best in the intermingling edges of two or more vegetation types, antelope have been called a "one-type

species," due to their tendency to occupy the center of open range land (Carhart 1940:3).

In winter the pronghorn gather into bands of all sexes and ages which frequently number into the thousands; during the summer the animals are highly dispersed.

Adult antelope weigh an average of 100 lb. (45 kg.), males being slightly heavier than females. The average field dressed weight of an adult antelope is 62 lb. (28 kg.) (Hay, et al. 1961) and the average amount of usable meat is estimated at 55 lb. (25 kg.) (White 1953:397).

WATERFOWL

Various species of ducks are abundant during certain seasons in North Park, which lies at the northern limit of waterfowl wintering grounds of the Central Flyway of the Rocky Mountains. Ducks appear as soon as open water appears on the streams and lakes, generally during the first part of April. The earliest flocks to arrive are composed largely of Mallards, with lesser numbers of Pintail and Green-winged Teal. Lesser Scaup, Redhead, Gadwalls and Baldpates reach appreciable numbers during summer months when the Park is completely free of ice.

The number of ducks decreases rapidly as the ice begins to cover the open water, with fall migrations in North Park reaching a peak in late October for most species. While some individuals may linger somewhat longer, most have left by mid-November (Johnson 1955).

The highest concentrations of waterfowl within the Park are found in Meadow-type lakes, followed by lakes in areas of sage-meadow. Lakes

in exclusively sage areas are least preferred (Kirkman 1956).

Non-Migratory Animals

BEAVER (CASTOR CANADENSIS)

Beaver habitat within North Park may be found anywhere along the streams between the floodplains to timberline where there is sufficient water and food, with aspen, willow and cottonwood being the preferred foods. While the populations density of beaver may be assumed to have been greater prehistorically, the density remains quite high today. Hay (1954) estimates that the population density in areas of suitable habitat within North Park ranged from approximately 3 to 77 individuals per square km., with 15 per square km. being the average. Streams with narrow, V-shaped valleys provide the least suitable habitat, while valleys with broad floodplains are most favorable.

Beaver are very active when streams and lakes are ice-free, but are generally confined to their lodges when the water surfaces are frozen, which in North Park is normally from late October until early April.

Maximum weight is attained in late fall, with mature beaver averaging approximately 55 lb. (25 kg.). The average amount of usable meat per animal is estimated at 38.5 lb. (17.5 kg.), according to White (1953:398).

SAGE GROUSE (CENTROCERCUS UROPHASIANUS)

While sage grouse apparently never inhabited the plains of eastern Colorado, large numbers appear to have originally inhabited the higher mountain valleys in the northern part of the state. The birds are largely dependent on sagebrush for subsistence, which comprises as much as 80% of the diet in mature birds (Patterson 1952). North Park, which contains approximately 2100 square km. of range dominated by sagebrush, today contains one of the highest sage grouse population densities in the state, and it can be assumed that the same situation, probably with a higher average population density, existed in prehistoric times (Rogers 1964). Dargan, et al. (1942) estimated the population density of sage grouse in various areas of North Park at between 4 and 46 per square km.; Boeker and Swope (1953) estimated the density at between 26 and 121 per square km. Several areas within the Park are known to have high population densities on a seasonal basis. In the fall, the area with the greatest density appears to be west and northwest of Walden from the Roaring Fork drainage, north past Lake John to the Big Creek Road, and south and east to Colorado Highway 125, within the main drainage of the North Platte River. An area just south of Walden near Peterson Ridge often has a very high population density in the winter or early spring. Also, two areas southeast of Walden near Spring Creek on the Owl Ridge road and west of Rand between the MacFarlane Reservoir and the Rand cutoff road, have good populations densities during the late winter and early spring. High densities of sage grouse are also known to have formerly existed in the Canadian and Michigan River drainages

east and northeast of Walden. The rest of the county contains a lighter population density (Rogers 1964).

Sage grouse average 4 lb. (1.8 kg.) in weight, with the amount of usable meat estimated to average 2.8 lb. (1.3 kg.) per bird (White 1953:398).

PRAIRIE DOG (CYNOMYS LEUCURUS)

The White-Tailed Prairie Dog generally inhabits plateaus and tablelands below 8,500 ft. (2591 m.). Preferred habitat within North Park is sagebrush steppe and meadow community types (Armstrong 1974:5). The prairie dog is omnivorous, eating insects as well as shrubby plants, weeds and grasses (Martin, et al. 1951:252). Prairie dogs do not hibernate to the extent of most burrowing animals and may be found outside their dens except during severe storms. Steon (1929) estimates that in areas of good habitat, population densities of as much as 3000 animals per hectare may be attained.

Prairie dogs are estimated to yield an average of 1.5 lb. (0.7 kg.) of usable meat per animal (White 1953:398).

RABBITS

Three members of the rabbit and hare family are found in North Park; the Snowshoe Hare (*Lepus americanus*), Nuttall's Cottontail (*Sylvilagus nuttallii*), and the White-tailed Jackrabbit (*Lepus townsendi*). The habitat of the Snowshoe Hare is the sub-alpine forest

community type, where coniferous forests provide favored forage in the form of various woody plants and shrubs. The animals are estimated to provide an average of 1.5 lb. (0.7 kg.) of usable meat per animal (White 1953:398). Nuttall's Cottontail characteristically inhabits edge situations in forests at elevations of up to 11,000 ft. (3354 m.). Sagebrush steppe, montane forest, and sub-alpine forest community types are favored habitat of the cottontail in North Park. An average of 1.75 lb. (0.8 kg.) of usable meat per animal is estimated by White (1953:398). The White-tailed Jackrabbit is generally an animal of the open plains but in North Park it inhabits sagebrush steppe, montane forest, sub-alpine forest and meadow community types (Armstrong 1974:5). Jackrabbits may congregate in the winter in wind-swept areas in the basin of the Park. They are estimated to provide an average of 3 lb. (1.4 kg.) of usable meat per animal (White 1953:398).

MARMOT (MARMOTA FLAVIVENTRIS)

The Yellow-bellied marmot is found in North Park from the park floor to 13,000 ft. (3963 m.), inhabiting montane forest, sub-alpine forest, meadow and tundra community types (Armstrong 1974:5). Its favorite habitat is among rock piles in grassy mountain meadows, and its food includes woody as well as herbaceous plants (Martin, et al. 1951:230).

Marmots usually hibernate by the first of October and reappear around the first part of April. The average live weight of the marmot is approximately 12 lb. (5.4 kg.) and the estimated average yield of

usable meat is 8 lb. (3.6 kg.) per animal (White 1952:398).

GROUND SQUIRRELS

Three species of ground squirrel are native in North Park. Richardson's ground squirrel (_Citellus richardsoni_) inhabits the sage plains and grasslands from the floor of the park to above timberline; the Thirteen-lined ground squirrel (_Citellus tridecemlineatus_) inhabits grassland areas to around 9000 ft. (2743 m.); the Golden mantled ground squirel (_Citellus lateralis_) is found in relatively open grasslands and forest edge communities up to 12,500 ft. (3810 m.) (Armstrong 1974).

Ground squirrels are almost entirely vegetarian, with seeds and the foliage of herbaceous plants forming the majority of their diet (Martin, et al. 1951:249). Hibernation usually begins in late September and lasts until early spring. While population densities of ground squirrels vary greatly with species and environmental conditions, an estimate of 120 per hectare is considered abundant for most species (Seton 1929). White (1953:398) estimates the usable meat for _C. tridecemlineatus_ at about 5.6 oz. (160 gr.).

Winter Game Counts

The Colorado Division of Wildlife has been making annual aerial winter big game counts in North Park and counts were obtained for 1975, 1976, 1978 and 1979. Deer and elk counts are listed by area in Table 6. These counts were made in January, February or March over a 4 to 10 day

TABLE 6

AERIAL WINTER BIG GAME COUNTS
IN NORTH PARK

	Elk				Deer			
Pinkham Creek North	1975	1976	1978	1979	1975	1976	1978	1979
Delaney Buttes	230	33	44	9	0	0	5	0
Peterson Ridge	0	0	19	0	22	105	91	21
Owl Ridge	51	74	16	1	79	210	94	26
Owl Mountain	132	108	140	183	66	8	168	208
Green Ridge	64	107	50	67	11	2	44	91
Buffalo Ridge	127	132	46	96	0	25	7	14
Buffalo Peak	0	0	66	19	13	0	16	4
Spicer Peak	34	0	37	32	8	0	0	0
Mexican Ridge	---*	0	0	6	---	0	0	0
Pole Mountain	13	0	5	0	6	0	0	0
Pitch Pine Mountain	62	0	13	0	0	0	0	0
Case Flats	98	76	51	62	0	0	0	0
Sheep R idge	0	0	12	0	120	167	98	141
Boettcher Ridge	66	0	3	1	---	0	0	0
Independence Mountain	245	381	525	472	222	270	415	489
North Platte River	148	146	349	323	40	25	88	96
Walden Falts	0	0	32	0	51	0	60	41
Walden N.E.	221	155	93	205	211	389	581	362
Sentinel Mountain	16	135	305	143	0	73	22	0
Alkali Lake Flats	---	---	---	77	---	---	---	---
Watson Mountain	---	---	---	0	---	---	---	58
Lake John Flats	0	133	---	---	0	0	---	---
Johnny Moore Mountain	---	---	---	6	---	---	---	0
Northgate	---	---	---	6	---	---	---	0
Pinkham Creek North	17	22	---	---	0	0	---	---
Total	1524	1502	1806	1753	849	1274	1689	1563

* Indicates no count taken. No counts available for 1977.

period. Counts were also obtained for antelope but the counting areas were identified by number and not name and a key was unavailable at this writing. Annual antelope counts for the Park are listed in Table 7.

The deer and elk counts show definite winter concentration in specific areas. Elk and deer concentrations are highest at Independence Mtn., Owl Mtn., Owl Ridge and the area northeast of Walden. This pattern probably reflects the availability of food in wind-blown areas. The area northeast of Walden is typically snow-free area in the winter. The south slope of Owl Ridge, and presumably of Independence Mtn. and Owl Mtn., is also scoured by the wind and is typically free of snow when other areas are covered.

Areas with high elk counts and low deer counts and vice versa probably reflect differences in the relative proportions of browse, grasses and forbs in those areas. As noted above, deer prefer browse while elk prefer to graze. This is especially evident for the Case Flats area, where grass and forb biomass is much higher than shrub biomass.

Big game numbers and distributions have undoubtedly been affected by European occupation. The effect on winter distributions has probably been minimal, however, since the primary factor appears to be the availability of snow-free areas. The two archeological sites in North Park with the greatest number of circular stone structures are located on Independence Mtn. and Owl Ridge, two areas with high winter elk and deer counts. This association will be explored more fully in a later section.

The antelope counts tend to be more variable from year to year,

TABLE 7

AERIAL ANTELOPE WINTER COUNTS
IN NORTH PARK

Year	Count
1970	8,308
1971	9,891
1972	8,433
1973	6,112
1974	7,486
1975	4,518
1976	8,590
1977	5,377
1978	5,515

which reflects the tendency for antelope to migrate in response to changes in climatic conditions. The number of antelope migrating into Wyoming during the winter varies with the severity of the winters. The winter of 1976, for example, was quite mild and the winter antelope counts were relatively high.

Also available from the Colorado Division of Wildlife are distribution maps for various game species. The mapped distributions include winter ranges, critical winter ranges, migration routes and fawning and calving area. As an example, Figure 7 shows the winter and critical winter ranges of mule deer. Winter range is that area occupied by deer under normal winter conditions and critical winter range consists of those areas favored by deer under severe winter conditions.

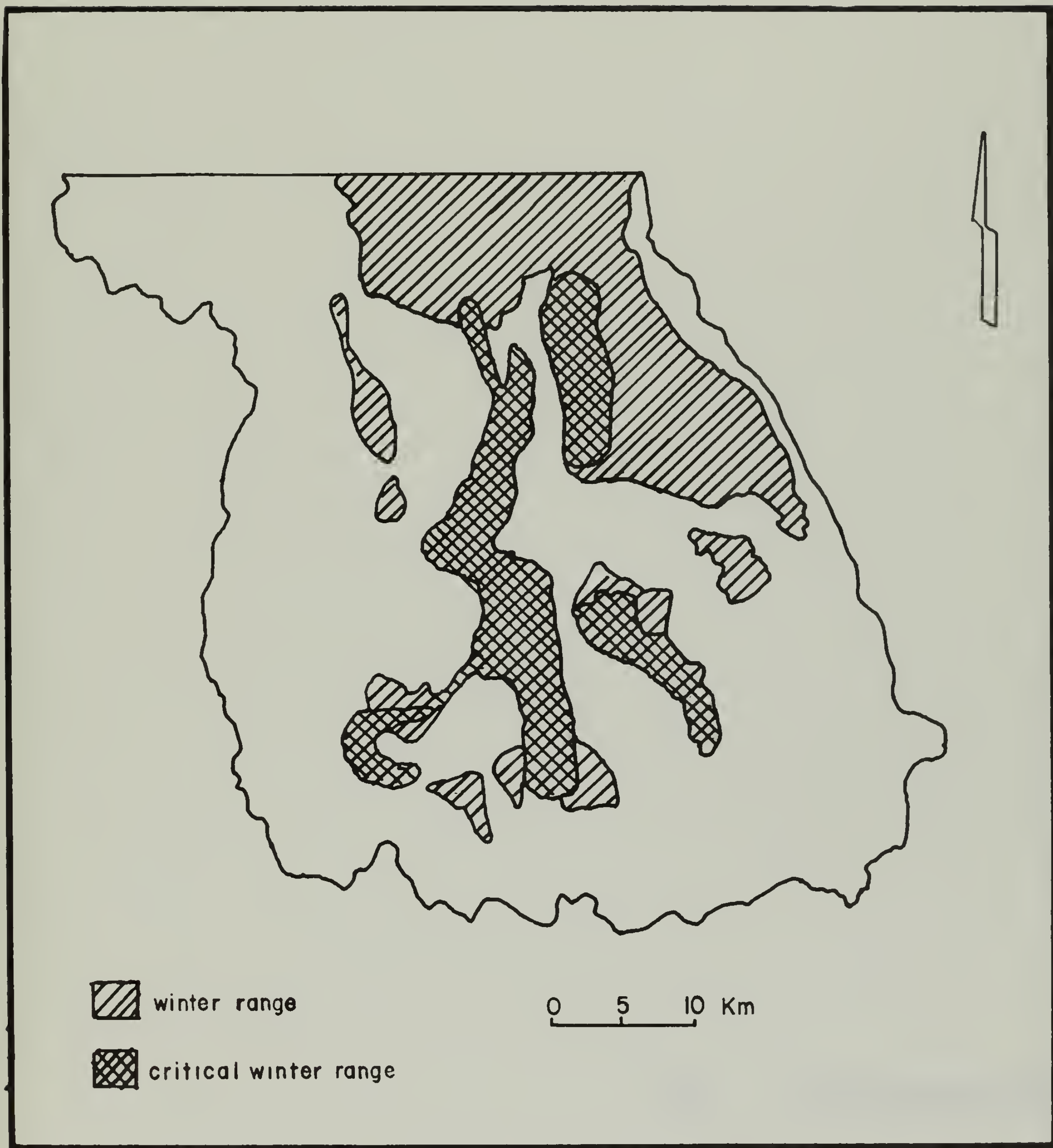

Figure 4. Winter and critical winter ranges of Mule Deer in North Park.

III. Prehistoric and Historic Background

III. PREHISTORIC AND HISTORIC BACKGROUND

by Joseph J. Lischka, Mark Miller and Kathie Joyner-McGuire

Since North Park is almost unknown archeologically, the summary presented here is drawn from archeological research conducted in neighboring regions and essentially indicates what kinds of prehistoric occupation may be found in the area. Also presented is a summary of known historic events that have occurred in the Park.

PREHISTORIC BACKGROUND

It is generally recognizes that human occupation of the New World began at least 30,000 years ago and possibly as early as 40,000 years ago. The earliest immigrants were necessarily hunters and gatherers, but the specific mode of their subsistence and the nature of their artifact inventory is a matter of dispute.

The Pre-Projectile Point Horizon

Krieger (1964) has postulated the existence of an early cultural horizon characterized by an artifact inventory consisting of relatively crude scrapers, flakes and pebble choppers and a specific absence of bifacially flaked projectile points. Radiocarbon dates associated with several finds in the New World, primarily in South America, indicate an antiquity of at least 30,000 years. Most of the artifacts associated

with this cultural horizon, however, are found on the surface under uncontrolled conditions and some archeologists feel that there is not enough information to support the idea that such a horizon exists in North America (J. Jennings 1974:74-81). If a site containing undisturbed artifacts relating to this horizon were discovered in North Park, it would be a find of major theoretical importance. The likelihood of finding such a site, however, is extremely small.

The Paleoindian Horizon (10,000 - 5000 B.C.)

The earliest well-dated cultural complexes found in North America are characterized by well-made lanceolate projectile points and other associated stone tool types. The cultures producing these tools were small nomadic groups with a primary dependence on the hunting of large game animals for subsistence. The Paleoindian Horizon is divided chronologically into three cultural traditions. The earliest of these is the Llano tradition, which is characterized by the fluted Clovis point and an association with the hunting of mammoth in the western states. The Llano tradition is well-documented at mammoth kill sites in New Mexico and Arizona, which have produced reliable C-14 dates in the 9200-9500 B.C. range. A C-14 date of 9330 $\pm$350 B.C. on the Union Pacific Mammoth Kill site in southern Wyoming puts it in the same time range as the Llano tradition but no artifacts diagnostic of the tradition were found with the mammoth (Irwin, Irwin and Agogino 1962). While typically a plains adaptation, a Clovis point has been found on a tundra ridgecrest in Rocky Mountain National Park (Benedict 1975a:71).

The Folsom tradition, characterized by the smaller, more finely made and fluted Folsom point and a consistent association with the remains of an extinct species of bison, follows the Llano tradition with associated dates ranging from 9000-7000 B.C. Although characteristically a high plains culture like the Llano, Folsom points have been found in western Colorado on the Uncompahgre Plateau (Huscher 1939:39), in Montrose County (Wormington 1955:120), near Grand Junction (Steward 1933) and along the Front Range (Benedict 1975a:71). Several Folsom points have been found in North Park by local residents. While unconfirmed reports such as these can only be the subject of speculation, they do raise the possibility that Folsom sites do exist in North Park.

The last of the Paleoindian traditions, the Plano tradition, is defined more generally than the preceding traditions and is characterized by a variety of unfluted, lanceolate projectile point types. Although dates associated with the tradition vary from area to area, a general ending date of about 5000 B.C. is proposed for the tradition. Several Plano point types have been found in the mountain areas of Colorado and Husted's (1962) survey of Rocky Mountain National Park gives strong indication that Plano hunters occupied the parks and valleys of the Colorado mountains, at least seasonally. Michael Burney (1976: personal communication) reports that a local resident of North Park showed him a lanceolate point during the summer of 1975 that was found in the Park. Examination of a photograph of the point indicates that it is similar in form to a Scottsbluff or Alberta point, which would give it an approximate date of 7000 to 600 B.C.

The Archaic Stage (5000 B.C. to historic contact)

A shift in subsistence orientation to exploitation of a greater range of food sources followed the Paleoindian traditions throughout North America, but the transition cocurred at different times in different places. The post-Pleistocene shift to more intensive exploitation of the environment in the western United States was originally terme⁻ the Desert Culture but has been more generally defined as the Western Archaic by J. Jennings (1974:154-189) to contrast it with the Eastern Archaic of the eastern United States where a similar re-orientation was going on under somewhat different circumstances. Western Archaic manifestations have been found in several areas of western Colorado. The best known of these manifestations is found in Dinosaur National Monument where an extensive excavation and survey program conducted by David A. Breternitz has revealed a long sequence of cultural development in the area (Breternitz 1970).

On the Great Plains, the transition from the Plano Tradition to a Plains Archaic culture occurred at about 5000 B.C. The Plains Archaic tool types exhibit greater similarities to the Eastern Archaic of the eastern U.S. than they do to the Western Archaic. The same shift to a broader resource base, however, is common to both.

The time period from about A.D. 100 to A.D. 1000 on the plains of eastern Colorado is termed the Colorado Plains Woodland (Scott 1973:1-2) and is characterized by the introduction of cord-marked pottery from further east and the use of domesticated plants in selected areas of the plains and foothills during the later part of the period. Agriculture

and the use of pottery is also characteristic of Fremont peoples in Utah and western Colorado from about A.D. 500 to A.D. 1300, but it is unlikely that Fremont peoples ranged as far east as North Park.

It is difficult to relate Western and Plains Archaic developments to what was going on in North Park because so little work has been done there and because the Park lies between the two culture areas. Frison, et al. (1974:123), however, see several clear temporal trends occurring in southern Wyoming that may apply to North Park. Fluted and simple lanceolate points of the Llano, Folsom and Plano traditions mark a horizon in the 9500-5000 B.C. time range. No projectile point styles are defined for the period from 5000 to 3000 B.C. The McKean Complex, characterized in southern Wyoming by the large, side-notched and basally indented Mallory Point occurs from about 3000 to 1000 B.C. From about 1000 B.C. to A.D. 1000, barbed, corner-notched points predominate, with small side-notched projectile points characterizing the period after A.D. 1000. The Hog Back Phase, a tradition defined by Nelson (1971:12), is defined by the use of small corner-notched projectile points with serrated edges and has been C^{14} dated at various sites in the foothills along the Front Range from A.D. 600 to 1000. Benedict (1975b:171-172) reports finds of comparable projectile points at timberline sites on both sides of the continental divide. In the foothills sites, the points are associated with cord-marked pottery.

Benedict and Olson (1978) have proposed that the Rocky Mountains served as a refuge area for Archaic populations fleeing less favorable regions during the hotter and drier climate of the Altithermal (5000-3000 B.C.). They suggest that such areas as the Great Basin and

Great Plains were depopulated during periods of maximum drought. The effect of the Altithermal on North Park is not well known. It has been proposed that active dune areas in the northeast part of the Park (North and East Sand Hills) were formed during the Altithermal but associated C^{14} dates suggest a later period of dune formation. Aboriginal occupation of the Park during the Altithermal is suggested by the projectile point chronology. In particular, at least two point bases found during the survey are similar to the Mount Albion point defined by Benedict and Olson (1978). That point style is diagnostic of the Mount Albion Complex, which is an Altithermal period sub-tradition located east of the continental divide.

THE ETHNOGRAPHIC PRESENT

This section is a summary of historical references concerning aboriginal occupation of North Park. Information from various sources indicate that the Park was occupied, or at least visited by several historic tribes. Arapaho, Cheyenne, a few Sioux and perhaps Crow from the Plains area visited the Park, though Sioux and Crow did so only in the company of the Arapaho and Cheyenne (Jackson and Spence 1970:451,714). Only Ute and Shoshone visited the Park from the basin area to the northwest and west. Historical information on specific groups is presented below.

The Ute

A number of references support the proposition that North Park was a traditional part of Ute territory. In Fremont's journal of his 1844 expedition, we read:

> "Descending from the pass we found ourselves again on the western water; and halted at noon on the edge of another mountain valley, called the Old Park...we were now moving with some caution, as, from the trail, we found the Arapaho villages had also passed this way; as we were coming out of their enemy's country, and this was a war-ground, we were desirous to avoid them " (Fremont 1850:414)

The pass that Fremont is referring to is Muddy Pass. He had just left North Park (called New Park by him and early trappers) and was entering Middle Park (Old Park) over the pass. The Arapaho were encountered in the vicinity of Kremmling. The Ute were the enemy of the Arapaho so Fremont is referring to North Park as Ute country. He also reports that the Arapaho encountered in Middle Park had preceded his party through North Park. In 1870 miners at Independence Mountain were warned by a group of Utes to leave the Park. Accounts of this incident tend to be somewhat contradictory. In one account, Utes led by Chief Piah and Chief John told the miners to leave the Park. In another account, the Utes involved were led by Chief Colorow and the incident occurred in 1876 (Gresham 1975:12-13). In the first account, a battle between Cheyenne and Utes took place in the north end of the park immediately after this and several of the miners were killed by Cheyenne. In other

accounts, the battle took place between the Arapaho and the Ute and the miners were killed by the Ute. A band of Utes who participated in the Meeker Massacre in 1879 fled to North Park after the incident and spent the winter in the north end of the Park. Stewart feels that the Ute, unlike other historic aboriginal inhabitants of Colorado, have remained in essentially the same place and therefore used the same areas for millenia (1966:41-42).

The Shoshone

Murphey and Murphey (1960) argue that the area around North Park may not have been extensively used by the Shoshone. They feel the area was used as an occasional hunting ground, probably because of the bison, but was far enough from their principal area of occupation that they did not attempt any long-term habitation in the area (1960:311). According to Shinkin, the Shoshone only used the North Park area during the annual bison hunt:

> "In this neighborhood (around Ft. Bridger), more especially near the headwaters of the creeks, they would stay for the summer. Early in the fall, they would return to Wind River and separate for the buffalo hunt. The band led by Ta'wunasia would go down the Sweetwater to the upper North Platte... certain modifications took place at times. Ta'wunasia's band occasionally stayed completely by itself, omitting the trip to Wind River." (Shinkin 1947:247)

All this indicates the area was used only seasonally and that there might have been a natural boundary of very poor land between the Rocky

Mountain Utes and the Wind River Shoshone. One account by an Indian agent at Ft. Bridger in 1849 places the Shoshones within the Park:

> "...their claim of boundary is to the east from the Red Buttes (near Casper, Wyoming), on the North Park of the Platte, to it's head in the Park, De-cay-a-que or Buffalo Bull Pen, in the Rocky Mountains; to the south across the mountains, over to the Yampa-pa, till it enters Green or Colorado River..." (Murphey and Murphey 1960:304).

The Arapaho and Cheyenne

Both tribes appear to have migrated from the area around Minnesota within historic times, settling finally in eastern Wyoming and Colorado, where they became bison hunters (Eggan 1955:35). Culturally, the two tribes were quite close and generally maintained friendly relations. The presence of Arapaho in North Park has already been documented by Fremont (cf. page 126). Also, Hilger quotes Farnham:

> "They (Arapahos) wander in the winter season over the country about the Kenyon of the Colorado of the West, and to a considerable distance down that river; and in the summer hunt the buffalo in the New Park (North Park) or 'Bull Pen', in the Old Park (Middle Park) on the Grand River (Colorado River), and in the 'Bayou Salade' (South Park) on the south fork of the Platte." (1952:2-3)

In 1913 Oliver W. Toll made a trip from Longmont to Estes Park in the company of three Arapaho, a guide and "a Princeton boy" for the purpose of getting the Indian names of geographical features in the

region. They did not get into North Park but Toll obtained some information on the Park from his Arapaho informants. The pass from the Park to the Laramie Plains was called "Buffalo Pass" by them, and they once had a fight with Utes there (Toll 1913:42). They also described a place called "The Door" where "...the North Platte crosses the Medicine Bow Range" (1913:43). The guide said that place is near the towns of Saratoga and Encampment. The North Platte, however, doesn't cross the Medicine Bows anywhere, though it goes through a narrow canyon just north of Northgate. It is possible that the Arapaho informants were referring to the Northgate area. Identifying the area is important, because the informants go on to say: "On the east side of the mountain they used to drive game up through it, where some of the hunters would be stationed to kill the game." (Toll 1913:43). There is, in fact, a large kill site at Northgate that has been pothunted for years. They also mentioned that they got blue paint clay at The Door. An Arapaho trail is also described in Toll's report that "...leaves North Park on Owl Creek, goes over Willow Pass, down Willow Creek into Middle Park..." and up over Arapaho Pass to Boulder (1913:64).

In summary, the available historical information indicates that the Ute have been long term residents of North Park and surrounding areas, with Shoshone visiting the area from time to time. By the early 1800's, Arapaho and, to a lesser degree, Cheyenne were moving into the area, at least during the summer, an incursion that the Ute were actively resisting. The establishment of reservations in Wyoming in the late 1800's put an end to Indian occupation of the Park.

HISTORIC BACKGROUND OF NORTH PARK

The first European visitors to North Park were probably trappers, who were in northwestern Colorado as early as 1819. The first known visitors were a party of trappers headed by Alexander Sinclair and Robert Bean who trapped beaver in the Park in 1825 (Athearn 1977:14). A number of trappers visited the Park into the 1840's, including Pegleg Smith, John Gantt, Kit Carson, Henry Fraeb, Calvin Jones, Bill Williams, Jim Baker, Sublette, Gervais and Vasquez. Baker subsequently acted as a guide for Sir George Gore on his hunting expedition into North Park in 1855 (Athearn 1977:19).

The second western expedition of John C. Fremont took him through North park in 1844, during which observations of the flora and fauna were made. Fremont's party entered the Park on June 15, 1844 and his description of the Park follows:

> "The valley narrowed as we ascended, and presently degenerated into a gorge, through which the river passes as through a gate. We entered it, and found ourselves in the New Park - a beautiful circular valley of thirty miles diameter, walled in all round with snowy mountains, rich with water and with grass, fringed with pine on the mountain sides below the snow line, and a paradise to all grazing animals. The Indian name for it signifies "cow lodge," of which our own may be considered a translation; the enclosure, the grass, the water, and the herds of buffalo roaming over it, naturally presenting the idea of a park. We halted for the night just within the gate, and expected, as usual, to see herds of buffalo; but an Arapaho village had been before us, and not one was to be seen. Latitude of the encampment 40 52'44". Elevation by the boiling point 7,720 feet.
>
> It is from this elevated cove, and from the gorges of the surrounding mountains, and some lakes within their bosoms, that the Great Platte river collects its first waters, and

certainly no river could ask a more beautiful origin.

16th. - In the morning we pursued our way through the Park, following a principal branch of the Platte, and crossing, among many smaller ones, a bold stream, scarcely fordable, called Lodge Pole Fork, and which issues from a lake in the mountains on the right, ten miles long. In the evening we encamped on a small stream near the upper end of the Park. Latitude of the camp 40 33'22".

17th. - We continued our way among the waters of the Park over the foot-hills of the bordering mountains, where we found good pasturage, and surprised and killed some buffalo. We fell into a broad and excellent trail, made by buffalo, where a wagon would pass with ease; and, in the course of the morning we crossed the summit of the Rocky Mountains, through a pass which was one of the most beautiful we had ever seen. The trail led among the aspens, through open ground, richly covered with grass, and carried us over an elevation of about 9,000 feet above the level of the sea." (Fremont 1850:413-414)

If Fremont's latitude for his June 16th camp is correct, and assuming that he camped on Grizzly Creek, his camp was located about 1 km. north of the Mellen Ranch and less than 1/2 km. west of one of our survey areas. It is extremely unlikely, however, that any evidence of the camp exists, save for a possible hearth.

North Park was visited 1 1/2 years before Fremont's trip by Rufus Sage, a western adventurer who later followed a literary career. His description of the Park, which he traversed during the first week in December, 1842, follows:

"On reaching the Platte we were ushered into a large and beautiful circular valley, known as the New Park.

This valley is thirty-five miles in width by thirty in breadth, and is shut in upon all sides by lofty mountains, whose summits tower far above the snow-line and sport their white-caps through each returning year. It is well watered by numerous streams that trace their course from the neighboring

heights to commingle with the Platte.

The river makes its exit from this place by a forced passage through narrow defiles, between the Medicine Bow and New Park Mountains, forming a canyon several miles in length, defined by precipitous walls, varying in height from fifty to six hundred feet..

The New Park valley affords considerable timber of various kinds, and a fertile soil, well adapted to cultivation. The superfice is usually a thick mould, compounded of clay, sand, and gravel, with decomposed vegetable matter; while the bottoms disclose a rich alluvion of two or three feet depth.

The entire country was crowded with game, in countless numbers, both of buffalo, elk, and deer. It seemed as though a general ingathering from mountain, hill, and plain, had taken place to winter in this chosen spot.

It is said the great abundance of game first suggested the christening of the locality as the New Park.

We remained in our encampment till the 5th of December, and improved the interval in procuring a choice supply of meat, and feasting upon those delicious viands which mountaineers so well know how to acquire and dispose of.

The day preceding our departure, a fall of snow covered the ground for several inches, but the lapse of a few hours served to disclose the bare vegetation of the valleys, and denuded spots upon the mountain sides.

Again en route, we continued up a large stream from the south and struck into a broad trail, which led through large openings and forests of aspen across the main mountain chain, to the waters of Grand River..." (Hafen and Hafen 1956:185-186)

Many subsequent travellers and settlers have seconded Sage's comments on the abundance of game in North Park. Most settlers killed game for food during the 1880's and 1890's and it was the usual custom for many settlers in the fall to kill enough deer, elk, or antelope to make a wagon load and sell it in towns outside the Park in order to purchase supplies. Luke Wheeler gave an account of his hunting experiences in North Park in the December 29, 1880 edition of the Fort Collins Express. He relates that he had just returned from North Park with fourteen large loads of elk, antelope and deer (500 antelope, 250

elk). He told of a herd of 500 elk that came within 600 yards of his camp before he left. At one time on the trip, he killed eighteen elk in ten minutes with his partner.

By the turn of the century, it was a different story for hunters and trappers. Beaver had disappeared by 189 from the Park. By 1917 deer were no longer abundant, mountain sheep were dying out, bear were few and elk had almost ceased to exist in the Park. In 1923 two game refuges were established in Routt National Forest in order to protect game. By 1929 deer and elk were on the increase and seasons were opened again.

North Park participated in the Colorado gold rush in a minor way with the development of placer mines on Independence Mountain in the 1860's. These mines continued to be worked until the turn of the century. The discovery of silver on Jack Creek in the south end of the Park in 1879 created the boom town of Teller City. Madore Cushman, "Old Cush," was the founder of Teller, then located in Grand County. The town was named after Henry M. Teller who represented Colorado for thirty years in the U.S. Senate (Gresham 1975).

The discovery of silver sparked a rush to the area and the town grew almost overnight, peaking in 1882 at around 1,300. Houses were crude cabins, few with anything but dirt floors and newspapers glued to the walls to prevent drafts. Since stoves had been freighted in, none of the houses had fireplaces.

The principal mine of the area was called the "Endomile," which W. H. Hocum initially owned, and it was situated several miles above Jack Creek near Teller. Jack Creek and Jack Park were so named for Jack

Bishop, an early prospector in the area who discovered the lead to the "Endomile" mine. This mine produced silver in "almost inexhaustable quantities" and was said to have brought more people into North Park than any other one thing (USFS nd:238). But, because of the lack of capital to reduce the ore to bullion, eventually the mine had to close down.

The "Gaslight" mine, discovered by John and Abe LaFevre, was another important mine in the area. The mine was located near Jack Creek, about two miles above Teller. It was bought from the LaFevres for $20,000 cash by a Mr. Adams when the mine was at a depth of twenty feet and further development proved successful.

Laramie was the main trading post for Teller and the stage line which made daily mail deliveries was established in 1882 and operated by the Patrick Brothers. Four to six horses were used on this line with changes several times along the route. Peter Munroe, a blacksmith, located his business on the banks of Jack Creek and made regular trips from Teller to Laramie in order to shoe stage horses at relief stations.

In 1881 a road from Teller to Grand Lake was begun. This would have been a very important link to the town of Teller since they were, at the time, part of Grand County, but the road was never finished. A road from Teller to Granby was completed in 1881 but a man had to be an excellent teamster to make the trip safely. In 1882, Cameron Pass to Ft. Collins was opened as a toll road.

At its peak, Teller boasted of two doctors, anywhere from three to twenty saloons at any one time, two steam sawmills, and a smelting works. A bank was proposed but was never chartered.

The Grand County Times, a newspaper begun in Teller City on May 12, 1881, published one last issue on November 22, 1883 before suspending publication. The headline read, "Teller City Mines do not Meet Expectations." The article went on to explain, "With this issue we suspend publication for the present. We can see no way to make it pay this winter. We endeavor to make it of benefit to Grand County's interest. We shall discontinue it until such time as the silver in our mines shall attract the attention it deserves and the necessary capital to extract it from the ores produced" (Colorado Prospector:1).

In 1885 Teller was abandoned almost overnight and the post office closed in 1886. The Cripple Creek boom was responsible for the rapid departure of most of the population, but there were a few who stayed in the Park and took up ranching, particularly in the Rand area.

Teller City today consists of a group of cabin remains. The walls of many are still standing but all milled lumber - roofs and window and door jambs - has been taken. Bottle collectors have left behind numerous potholes and scattered trash. Few middens remain undisturbed.

There is abundant coal in North Park and coal mining began around 1885, primarily for local, domestic use. It was in 1885 that the Riach brothers discovered a large coal vein near what is today Coalmont and named it the "Little Grizzly Coal Mine." Teams were simply driven up to the vein and wagons loaded directly. After the Riach brothers filed a claim on the vein, they began charging $1.50 a ton. Around 1905 the Larimer County Democrat in Ft. Collins reported that the Little Grizzly property consisted of 4,234 acres, most of which was underlain by a sixty-five foot thick coal vein. The coal was of good quality and made

an ideal fuel. According to the article in the Democrat: "...it is safe to say that the combined tonnage of all the coal fields in Colorado, east of the mountains, will not equal that of the Riach Bros.' property." It is also stated in the article that the coal seams lie very close to the surface and could be removed at a very low cost by stripping and loading onto railroad cars. In 1909 the district yielded two thousand tons of subbituminous coal. In 1912, the Little Grizzly Coal Mine, which was the thickest bed in the Coalmont District, yielded eight hundred tons of coal a day, most of which was used domestically. The mine supplied coal to the town of Walden and nearby ranchers for about fifteen years. Walden being the focal point of trade in North Park required much coal for two general stores, several saloons, and a school house. Getting the necessary fuel to the town in adverse weather was quite difficult.

After one of the Riach brothers died, the other sold out to an eastern firm, the Consolidated Gold, Copper and Coal Company from Philadelphia, and fuller development of the mine ensued. The town of Coalmont was established in 1911. A railroad, the Laramie Plains Line, was built from Laramie to Coalmont and the first train reached Coalmont in November, 1911. Within a year, this line was sold for a fraction of the ten million dollar cost and in 1914 it was renamed the Colorado, Wyoming and Eastern Railway Company. After another sale it became the Laramie, North Park and Western Railroad until that was dissolved in 1936 when the Union Pacific took over the trackage (Hollenback 1960).

From 1909-19 the Coalmont mine yielded 310,000 tons of good quality coal. Later it became part of the Moore System which included: 1)

Moore #1, also called Rabbit Ears Mine, which yielded 647,000 tons between 1922-34; 2) Moore #2 which yielded only 9,060 tons; 3) Moore #4 and Moore Strip which yielded 493,127 tons between 1915-21 and 1935-51. There is no available record of the usage of the coal (Adams 1976:14-19).

The North Park Coal company was the principal employer during Coalmont's first ten years. By 1929, the town consisted of sixty houses in addition to a store, a Post Office established in 1913, a warehouse, a bathhouse/office, a doctor's office, stable, etc. The school was situated in the middle of the town. The population was around two hundred in the winter and a bit less in the summer. Coalmont's success fluctuated up and down as the ownership of the mine changed hands several times.

In the early days of Coalmont a fire erupted in the mine which caused its final abandonment. The long smoldering fire continued to burn for years and, as the Postmistress of Coalmont explained in 1969, there are still days when one can see and smell the smoke (Scher 1969). In 1949, trenching operations isolated the fire and saved five million tons of coal.

In 1960 the last operation of the Coalmont mine shut down and in 1964 the Union Pacific pulled up the tract from Coalmont to Hebron. In 1975 the Grizzly Creek Strip was the only mine operating in the Coalmont area and it gave 65,000 tons that year.

Another district in North Park, the MacCallum district, is comprised of three strip mines; then drift-slope mines; minor underground mines; and four prospects. The Marr Mine was the first to

produce in this district, yielding 1200 tons. The railroad never ran to this area so coal had to be trucked out. Its primary use was also domestic and removal continued until 1959. Between 1923-59, the Marr Strip #1 (formerly Kerr Strip) produced 100,000 tons and the coal was of good quality (Adams 1976:14-19). The MacCallum Mine was a slope mine and used intermittently and locally. All the work in this mine dates before 1915 (Adams 1976).

Various other mines in North Park produced small amounts of usually poor grade coal. The Capron Mine, 4.5 miles east of Walden, is one of these. In the 1930's, a small amount of coal was extracted from Jackson Mine and also in 1942 from the Jackson-Bourg Mine, but little else is known about these mines. Sudduth Mine was a drift mine from about 1938-48 and existed probably as early as 1911, supplying locals with domestic fuel. Coal was also present in the Pole Mountain-Mexican Creek area southwest of Coalmont and was used mainly for domestic purposes. It was abandoned by 1911.

In 1900 copper was discovered around the Big Creek Park area in the northwest part of the Park near the town of Pearl. Cooke Rhea was the first pioneer in the area and in 1903 his daughter wrote about the copper mines. "In the early part of the 1900's the Big Creek and Big Horn Mines were discovered and staked. Operations began almost immediately. ...In December of 1900 a survey and plot were made for the town of Pearl. The Town of Pearl was incorporated under the laws of the State of Colorado, October 21, 1901" (Gresham 1975:43). Pearl was situated near the headwaters of the Big Creek which flows into the North Platte. The first store was built in 1901, the same year the Pearl

House was built. Most travel came and went from Encampment, Wyoming as well as from Laramie, eighty miles away. The "Pearl Mining Times" was published in Encampment until 1902 when the presses were moved to Pearl. The Post Office was located at the Elmes Ranch and Mrs. Elmes was the Postmistress.

In 1901 Pearl was described as the "Mining Metropolis of Big Creek Park" in the "North Park Union" (Gresham 1975:240). In addition to copper, small amounts of gold and silver had been found. The first town elections were held in December of 1901. LaFevre Sawmill, which was located sixty miles away on the upper Michigan River, supplied the lumber for the first buildings in the town. In 1902 there were between fifty and one hundred inhabitants.

Six copper mines were opened and construction of a smelter was begun. In 1905, the smelter was nearly completed and hopes of beginning production by July prevailed. Much machinery had been ordered from Denver to complete the smelter. But again, due to prospecting and transportation costs, another small town began to flounder. The operation proved to be too expensive, the smelter never opened and the whole mining operation was abandoned around 1908.

Other natural resources utilized include gravel and fluorspar. Gravel was abundant and used locally for roads. Fluorspar was found in the north section of the Park and was said to be one of the largest deposits in the western United States (Hail 1965). Much fluorspar prospecting went on in the Park Range in northwest North Park in the 1920's. A Mr. M. P. Cloonan established the Colorado Fluorspar Corporation in 1925.

Lumbering businesses began early in North Park and lumbering activities continue to the present. Timber was abundant in the surrounding mountains, especially yellow pine and white and yellow spruce. Lodge pole timber was plentiful and used widely for fences and corrals (Hanson 1967). In 1905 the Routt Forest Preserve was created which meant that all the timber being cut was being done so in trespass. There was a large demand for timber from growing communities and the railroad and in 1906 Routt National Forest made its first timber sale to Mountain States Telephone and Telegraph Company. Lumber was hauled by a wagon with an oxen team. A sawmill was established by E. V. Wall near Rabbit Ears this same year. A Mr. Chalmber had the first water-powered sawmill.

The town of Gould, sometimes referred to as Poverty Flats, was a result of the lumber business. In 1936 the Michigan River Timber Company, owned by Forest Products Trading Company in Nebraska, purchased twenty acres of land from the United States Forest Service in the vicinity of Cameron Pass and established a camp for timber cutters. This was referred to as the "Cameron Trout Lodge." Initially the cutters lived in tents until about sixty cabins were built by the Michigan River Timber Company. Another small camp of about ten cabins called "Skidder Camp" was located in the woods. Lindland had the nearest Post Office, established in 1922, which was located about three miles to the northeast of present-day Gould, near Custer Mountain and below the Michigan River. This Post Office lasted about thirteen or fourteen years and was only open in the summer time.

The Company had two sawmills set up in the woods. Ben Chaney had a

contract with the Michigan River Timber Company for ties and lumber and his brother, Amos, did the trucking for the mills. Another associate hauled the wood to Walden. In 1937, an office was established in Walden. A Post Office was established that same year in the main camp, also called Penefold. Later the name was changed to Gould in honor of Edward Gould, an early settler in North Park who helped build some of the first buildings in North Park and also worked at the tiny community of Owl located about ten miles north-northeast of Rand. Owl was established by an old prospector, August Speck, in 1899. In 1937, a school was completed in Gould with community furnished materials and time donated by the men. A ranger station was opened in 1936 and a tourist supply store was established in 1940. In 1936, one mill was destroyed by fire and that very same month a fire in the office destroyed many records of the timber company. Despite these set-backs, a diesel-powered mill was then built in Walden and all lumber was trucked to this new site. About forty men were needed to operate this new mill.

In the 1870's cattlemen pushed into North Park from Wyoming. At this time the cattle were driven out of the Park in the early fall because it was believed that the cattle could not survive such a harsh winter environment. But in 1878 John S. Fordyce wintered the first cattle in North Park. In 1879 J. A. Mendenhall settled in North Park with 3,000 cattle and 600 horses.

During the summer of 1879 cattlemen brought cattle into North Park because of a drought around Laramie. English and Scotch cattle flourished everywhere in the Park and on the Laramie plain until a very

bad year in 1887 which was the downfall of the English cattle empire in the area.

The winters were quite extreme and Vic Hanson, an early rancher, described the cattle industry in North Park as, "Truly it was a rancher's heaven in the summer and proved to be a rancher's hell in the winter until hay feeding became an established practice" (Hanson 1967:22). When cattle were first wintered in the Park, there was a series of moderate winters and the cattlemen were able to get through the season easily without supplemental feed. In 1883-84, however, the winters returned to their normal severity and an enormous amount of stock was lost. The winter was so severe in 1887 that the cattle drifted aimlessly in the storms. In a blind search for food, they gnawed at bark and wandered through towns. Since cattle won't eat snow and the creeks were frozen solid, they were complete without water and thousands died (Hanson 1967).

The ranchers began putting up wild hay and later clearing sage and willow to make room for more hay cultivation. After that, hay feeding became a common and essential part of the stockmens' lives, although some of the cattlemen did not like the idea of having to farm since that occupation was considered below a cowboy.

Hay cutting begins in late July or early August, each field yielding one cutting. Armistice Day is the usual day for the beginning of cattle feeding and it lasts till May. The cattle are fed every day and about two tons of hay per head of cattle is needed for the winter. Most ranchers try to put up more than this just to be safe since the primary concern of every rancher in the winter is the health of his

stock.

With the advent of irrigation on a big scale, hay raising, along with stockraising, became one of North Park's major industries. Miles of ditches had to be dug and acres of sage had to be drowned out in the bottom land to make room for the native grasses.

Exporting of surplus hay began about 1914. "Big loads were sold outside the Park when there was a surplus and North Park native hay became famous as horse feed and even brought a premium in price" (Hanson 1967:25).

The first cattlemens' association was established in 1896 with thirteen members, and about 1898 the first white-faced Hereford bull was brought into the Park. By 1905 the majority of cattle were of this breed. Besides the fact that they were believed to be better beef, they were considered more hearty, better foragers, and more uniform in color. Despite their heartiness, there were still many losses from birth to the market the following year, primarily during the winter.

By 1900 big cattle organizations were being formed such as the Big Horn Cattle Company organized by Boettcher and Marr. These large organizations controlled about 75% of the livestock on the western slope and included outfits like "Sevens," "Two Bars," "Two Circle Bars," "Ayers," and "OVO." The battle for range and control of thievery resulted in the organization of the Snake and Bear River Stock Association in the latter 1800's (USFS nd). The Park was finally getting on its feet with cattle raising and in 1909 the "Walden New Era" carried the headline, "Winter Stock Loss not Expected to Exceed 3%--snowiest winter in thirty years left small losses" (Colorado

Prospector:7).

In the early part of the twentieth century, mountain lands in the Park were placed in the National Forest (Routt) and ranchers had to obtain grazing permits which were easily secured at first. But in the early 1920's, the land rush by "sod busters" reached its peak and this completely ended the free range system as ranchers tried to obtain title to as much of the dry rangeland as they could. In 1931, many ranchers went broke as a result of the depression and a few ranchers became interested in obtaining sheep.

The Taylor Grazing Act of 1934 authorized the Secretary of Interior to regulate the uses of public lands. In particular, authority was given to regulate livestock grazing by issuing permits or leases for public lands classified as suitable for grazing. Ranchers were generally able to obtain permits for public lands they had been using to graze livestock prior to passage of the Act. Permits could only be obtained by ranches established on privately owned land. Sale of a ranch generally gave the new owner access to the permitted grazing lands of that ranch. Many of the smaller ranches in North Park were purchased by already established ranchers to obtain more permitted grazing land in the public domain. This process of absorption of the smaller by the larger accounts for many of the abandoned ranchhouses and farmsteads seen in North Park today.

The towns of Walden and Hebron helped in the slow process of ringing permanence to the stockraising industry in North Park. Walden, which eventually became and still is the trade center of the Park, first began as a service to the area ranchers. In the early 1880's Ike Green,

who saw the land on the Illinois River just west of Walden as a potentially fruitful area for development, had it plotted into sixteen blocks laid out with alleys and named it "Point of the Rocks." Green built the first house in 1888 and also established a one-room schoolhouse for the new town. The town site was sold to Abe LaFebre in 1889 who plotted it again that same year and in 1892 there were two saloons with dance halls, two general stores, a doctor and drug store, a hotel, a few residences and a Post Office established in 1881. The town was supplied with water by a well and windmill. In 1900 the population totalled 141; in 1910, it was 162; and in 1920, it was 260.

In 1894 Gene Mosman became Walden's first mayor. His family's supply store established in 1889 became the supply point for all of North Park.

The first telephone line was established in 1896 and ran from the Mosman Store in Pinkhampton in the north end of the Park with the Mosmans paying most of the expense. In 1906 the telephone was brought to North Park on a large scale and Walden was the first to feel its impact. The Colorado Telephone Company had planned to establish a toll line in North Park with connections with all points along the Moffat Road and a direct connection with Denver and all points in Routt County. Walden was to be the central station for all these connections. Ranchers paid fifty cents a month while businesses paid thirty dollars a year for the service (Gresham 1975). By 1907 most ranches in the area had telephone service, at times with sixteen-member party lines. Repairs were usually made by the customers themselves.

Hebron was another ranching community, of which J. MacFarlane was

an early pioneer. In 1884 a meeting was held to organize the town and a town site was located between the forks of the Big and Little Grizzly Creeks, which situated Hebron near the goegraphical center of the Park, within six miles of the coal beds owned by the railroad. Plans for a school, hotel, church, and post office were made. An old preacher by the name of Morey gave Hebron its biblical name and was instrumental in the establishment of the post office in 1884.

The sheep industry in North Park had a rather controversial beginning. Most cattlemen saw sheep as a threat to the grassland but a few saw sheep as heartier, more profitable stock that wintered better than cattle and, with sheep herders' wages being so low, maintenance of the herds was low. Sheep provided both meat and wool and in the 1890's there were more than two million in Wyoming. In 1907, the Carbon City Woolgrowers' Association of Wyoming and the Snake River Stockgrowers' of Colorado agreed that sheep could enter North Park and "graze upon a certain portion of Routt National Forest lying west of the land in Colorado now being used by Sheepmen..." (USFS nd:48). Many financially hard pressed stockmen began to see the merits of sheep raising and began the transition. By the 1930's and 1940's sheep had become second only to cattle in importance.

The population of Jackson County is 1,811, according to the 1970 census. The population of Walden, the county seat and biggest town in North Park, is 907. Other towns in North Park are Cowdrey (pop. ca. 50), Rand (pop. ca. 20) and Gould (pop. ca. 10). As indicated by these figures, a relatively large part of the population is rural. Dominant economic interests in the Park today are ranching, hay farming and coal

mining.

PRIOR ARCHEOLOGICAL INVESTIGATIONS IN NORTH PARK

There has been very little prior archeological fieldwork in North Park other than small, surface survey projects. Professional interest in the Park's prehistory has been a fairly recent development in comparison to other areas of Colorado and adjacent states. The earliest recorded archeology that specifically deals with Jackson County is the pre-World War II excavation of what has been described as a bison kill by Roy Coffin, an amateur from Fort Collins who performed the investigations. The site (5JA7) lies in the extreme northern portion of the area near the North Platte River. It is located just outside the North Park basin and just northeast of where the North Platte crosses the Independence Mountain thrust fault. Coffin's investigations have never been fully reported and the only specific documentation of the site exists today on a BLM site inventory form.

The Fort Collins Museum has two artifact trays in storage, apparently donated after Coffin's death, that are believed to contain artifacts from the bison kill. The trays contain a total of 181 items. The majority of the artifacts are small, side-notched projectile points, many with basal notches. The size and overall morphology of these tools suggests a Late Prehistoric age (ca. A.D. 500-1800) for the site component or components from which the artifacts were removed.

Johnson (1972) mentions a bison trap site in northern North Park which was investigated by the Coffin family and which yielded

approximately 3000 artifacts. It is probably the same site as 5JA7. Of particular interest is that two crudely-made steel projectile points were reported to have come from this site (Johnson 1972). Steel points suggest either direct or indirect European contact and therefore a relatively late date for the component or components from which the points were removed, perhaps as recent as the 18th or 19th century. As previously mentioned, this site may be the hunting spot described by Toll (1913:43).

Three artifacts from the site resemble the bifacially flaked knives which Frison (1978) has identified as horizon markers for late Shoshoni occupation. These knives have not yet undergone detailed analysis, but the possibility of a Shoshoni occupation should be investigated. Material types displayed in the artifact assemblage include quartzites that are similar to those found in the North Park Basin; a banded, brown chert that is known from the Wyoming Basin to the west; chalcedonies and some obsidian. Further analysis is planned for these artifacts, and landowner permission has been granted for more fieldwork in the near future.

Lischka (1976) documented 26 archeological sites in North Park recorded prior to 1976. Most of these, including 5JA7, have detailed locational information. Several sites, including what appear to be five conical timber lodges in the northern portion of the Park (Johnson 1972) have only general locational descriptions. Recent investigations, subsequent to 1976 and excluding the North Park Project, have recorded at least 25 additional prehistoric sites within the Park. Some sites (cf. Gordon and Kranzush 1978) could not be assigned a prehistoric or

non-European affiliation due to lack fo sufficient diagnostic material, and therefore were not considered in this analysis. Archeological investigations by several organizations are continuing in North Park, but results are not currently available for inclusion here.

All available site clasifications for 51 prehistoric and/or non-European sites recorded in North Park independent of the North Park project are tabulated below (Table 8). These sites have been variously classified by investigators into purely descriptive groups or functional types. In many cases the type of activities which may have been performed at sites are mentioned but standardized site classification criteria are not explicitly offered. The present site classifications are not necessarily mutually exclusive, but they serve as an indication of the variability in site type which has been documented in the Park.

Two sites have been initially described as burial trees (AR-05-010-133 and AR-05-010-135), but some authors suggest these sites may be hunting stands (Gordon and Kranzush 1978). More detailed evidence is needed from these sites, but if they are burial trees one might expect human bone to be present. Unfortunately, there is no current information of the contents of either of these sites. One of these sites (AR-05-010-135) does not have sufficient provenience information to determine whether or not it is actually a separate site.

Twenty sites have been variously described as chipping sites, lithic sites or scatters and artifact areas. These sites are generally recognized on the basis of a definable concentration of lithic tools with little other evidence. Taken as a group, this is the largest category of previously recorded sites in North Park. One of these,

site 5JA133, has not been placed in a chronological position by the site recorders (Jennings and Taylor 1976), but they describe a grooved stone hammer which is similar to tools that Frison (1978:82) considers to be diagnostic of the Late Prehistoric period.

Several prehistoric sites from the North Sand Hills are defined as limited activity areas, areas of tool manufacture or concentrations of lithics and bone (Gordon and Kranzush 1978) (cf. Table 8). One site in the North Sand Hills is recognized as an area where multiple activities took place. Charcoal lenses appear at some of these sand hill sites which may indicate more intense occupation and additional activities. Most of these sand hill sites occur in areas of active dunes and the relationship of portable artifacts to in situ features may be difficult to establish.

A total of three possible stone quarries have been reported, one in association with stone circles. One of these sites (5JA6) contains abundant quartzite varying in color from grey to white. Another, site 5JA337, is located on Owl Ridge.

TABLE 8

ARCHAEOLOGICAL SITES OTHER THAN THOSE RECORDED
DURING THE NORTH PARK PROJECT

Site Number (Smithsonian When Available)	Site Classification	Chronological Position	Reference
AR-05-010-113	Burial Tree	Historic Ute?	OSAC Files*
5JA41	Chipping Site	?	OSAC Files
AR-05-010-117	Tipi Rings	Ute or Arapaho	OSAC Files
5JA6	Quarry?	?	OSAC Files
5JA2	Lithic Site	?	OSAC Files
5JA133	Lithic Scatter	Late Prehistoric?	Jennings & Taylor 1976
5JA32	Temporary Hunting Camp?	?	Anderson 1977
AR-05-010-133	Artifact Area	?	OSAC Files
AR-05-010-134	Artifact Area	?	OSAC Files
5JA4	Tipi Rings	Late Prehistoric Paleoindian	OSAC Files
AR-05-010-131	Artifact Area	?	OSAC Files
5JA3	Camp, structures	?	OSAC Files
AR-05-010-130	Artifact Area	?	OSAC Files
AR-05-010-129	Artifact ARea	?	OSAC Files
5JA7	Bison Kill	Late Prehistoric or Protohistoric	OSAC Files
AR-05-010-116	Tipi Rings**	?	OSAC Files
5JA38	Chipping Site	Ute?	McGarry 1978
5JA39	Chipping Site	Ute?	McGarry 1978
5JA25	Tipi Rings	Ute?	OSAC Files
5JA26	Battlefield	Historic Ute?	OSAC Files
5JA8	Campsite	?	OSAC Files
5JA1	Tipi Rings, Camp	?	OSAC Files
5JA43	Lithic Scatter	?	Anderson 1977
5JA58	Multiple Activity	A.D. 995 ± 75 (UGa-2212)	Gordon personal communication 1978
5JA212	Lithic Scatter	?	McNamara 1978

* Office of the State Archaeologist Site Files.

** Indicates tipis which supposedly retain part of pole structure.

TABLE 8
(Continued)

ARCHAEOLOGICAL SITES OTHER THAN THOSE RECORDED
DURING THE NORTH PARK PROJECT

Site Number (Smithsonian When Available)	Site Classification	Chronological Position	Reference
5JA213	Lithic Scatter	?	McNamara 1978
5JA214	Lithic Scatter	?	McNamara 1978
5JA215	Lithic Scatter	?	McNamara 1978
5JA217	Lithic Scatter	?	McNamara 1978
5JA218	Quarry	?	McNamara 1978
5JA219	Lithic Scatter	?	McNamara 1978
5JA220	Lithic Scatter	?	McNamara 1978
5JA42	Rock Wall, Rifle Pit	?	McGarry 1978
5JA47	Tipi Rings	?	McGarry 1978
5JA334	Stone Circles, Quarry	?	Moore et al. 1979
5JA335	Stone Circles	?	Moore et al. 1979
5JA336	Stone Circle	?	Moore et al. 1979
5JA337	Stone Circle, Habitation	?	Moore et al. 1979
5JA75	Lithic Scatter	?	Anderson & Hurlbutt 1974
5JA76	Short Term Camp	PaleoIndian	Anderson & Hurlbutt 1974
5JA60	Limited Activity	?	Gordon & Kranzush 1978
5JA61	Lithic/Bone Concentration	Protohistoric or Historic	Gordon & Kranzush 1978
5JA63	Lithic/Bone Scatter	L. Prehistoric	Gordon & Kranzush 1978
5JA64	Lithic Scatter	Protohistoric or Historic	Gordon & Kranzush 1978
5JA65	Tool Manufacture	?	Gordon & Kranzush 1978
5JA66	Rock Concentration/Bone	Late Plains Archaic?	Gordon & Kranzush 1978
5JA67	Tool Manufacture?	?	Gordon & Kranzush 1978
5JA5	Stone Circles Camp	?	OSAC Files
AR-05-101-135	Burial Tree	?	OSAC Files
AR-05-010-136	Tipi Poles	?	OSAC Files
AR-01-010-137	Tipi Rings	?	OSAC Files

* Office of the State Archaeologist Site Files.
** Indicates tipis which supposedly retain part of pole structure.

IV. Research Design and Methods

IV. RESEARCH DESIGN AND METHODS

by Joseph J. Lischka

Site patterning in relation to various features of the environment is presumed to be non-random and the result of rational decisions made by the inhabitants of those sites. Those decisions were probably based on a combination of circumstances that varied in response to the changing needs of the group, seasonal variations and the kinds of activities that were carried out at the sites. For example, a hunting and gathering group trying to decide where to establish a base camp during the summer might consider distance from large and small game habitats, density of wild plant foods in the area, distance from water, numbers of mosquitoes in the area and visibility of the surrounding countryside as relevant factors. If it were winter, a different set of criteria would be important.

The task of the archeologist is to identify those features that were considered important in the decision-making process. This is done by investigating patterns of association between site locations and features of the biophysical and social environment. The success of the investigation depends in part on selection of the features or variables included in the analysis and on identification of different site types with respect to the kinds of activities engaged in. Herein lies the deductive nature of the investigation. The archeologist presents as a set of hypotheses those variables which are considered to be relevant

for a specific settlement system. Those hypotheses are then tested by determining whether or not the patterns of associations suggested by the hypotheses actually exist. The analysis can also be inductive in that previously unsuspected patterns of association might be discovered in the analysis. Several limitations, however, must be kept in mind. The theoretical orientation of the archeologist might exclude relevant variables. Also, it might be difficult to reconstruct the changes in fauna, vegetation and climate that have occurred through time. A further limitation is the problem of reconstructing social environments at any given point in time. Did one or several groups occupy a given area at any one time? If there were several groups, did they live together in peace or were they hostile? Environmental and archeological investigations in North Park are just beginning and many of these questions remain to be answered. The research design presented here is a first step in answering those questions.

THE SETTLEMENT-SUBSISTENCE MODEL

The research design of this study is based on the assumption that the basic determinants of human behavior are economic in nature and that the subsistence and settlement activities of a group involve rational decisions concerning the use of resources and the scheduling of their use. It is further assumed that the prehistoric inhabitants of North Park, in the absence of evidence to the contrary, were exclusively dependent on the exploitation of wild plant and animal food resources. It follows that the spatial distribution of prehistoric sites should

correlate in some degree with the distribution of those and other exploited resources. Other factors, such as relations with other groups occupying an area, may also influence decisions regarding settlement location. The archeologist, however, has less control over these factors. Consequently, primary emphasis is placed in the analysis on measurable variables.

The general approach used in this analysis is based on a model developed by Jochim (1976) for explaining the behavior of hunters and gatherers, in combination with site catchment analysis.

In his model of hunter-gatherer subsistence, Jochim defines three major areas of concern: (1) resource use and scheduling, (2) settlement location and (3) population distributions (1976:11-13). According to Jochim (1976:15-45), the primary goals considered by hunters and gatherers in deciding what resources to exploit and when to exploit them are: (1) maintenance of a secure and reliable level of resource input and (2) expending a minimum of effort in obtaining those resources. Secondary considerations involve obtaining good tasting foods and a variety of foods, gaining prestige through the pursuit of high risk reources and the maintenance of sex role differentiation. Prestige is gained by pursuing high risk-low security resources such as large game. Conversely, obtaining high security resources that are relatively abundant and easy to obtain gives relatively low prestige. Low prestige resources, according to Jochim, generally include plant foods and small game. One wonders if the high-low prestige dichotomy extends to the activities of archeologists in the Rocky Mountains where there generally seems to be greater interest and prestige attached to the study of

Paleoindian big game hunters than to investigations of the more pedestrian hunters and gatherers of the Archaic.

Ideally, the archeologist would like to know the kinds of food eaten by the prehistoric inhabitants of an area and the proportions of different kinds of food eaten. Archeological surveys do not usually provide this kind of information. In the absence of excavated data, however, the resource potential of an area can be evaluated in terms of the present day distributions of potential floral and faunal resources, keeping always in mind the fact that climatic changes in the past probably altered those distributions. One mitigating factor is the probability that although the species composition of vegetational communities in given micro-environments may change with changes in climate, the relative biomass values between micro-environments should exhibit less variation. The same is probably less true for more mobile faunal communities.

Resource Use and Scheduling

Ethnographic information provides a base line for identifying potential food resources that can be extended into the past, again with some caution. Ethnographic information on subsistence patterns of the Ute, Shoshone, Cheyenne and Arapaho was compiled to assist in establishing the edible resource baseline because it is known that these groups frequented North Park in varying degrees during the ethnographic present. It should be kept in mind that the subsistence patterns of these groups were dependent in part on the horse.

The Ute adopted a number of Plains characteristics during the late eighteenth and nineteenth centuries but changes in subsistence patterns were relatively minor, save for periodic hunting expeditions to the Plains. A primary dependence on small game and local vegetation continued (cf. Lowie 1924:199-203; Smith 1974). According to information obtained from the White River Ute (Smith 1974), animals eaten included deer, bison, elk, beaver, rabbits, fish, sage hens, bear, mountain sheep, ground squirrel, badger and skunk. Animals specifically avoided for food were porcupine, grasshopper, locust, horses, snakes, dogs, wild honey, field mice, wildcats, wolverines, weasels, wolves and coyotes. Elk were hunted by the surround method or stalked on snowshoes. In the fall, when antelope were fat, herds were driven over cliffs. Smith reported as many as 200 antelope might be taken at one time using this method (1974:55). Many kinds of wild plants were used as food; berries were mashed and dried for winter use, seeds were ground on metates, greens were boiled and the inner bark of pine was rolled and eaten.

Shoshone subsistence patterns were much like those of the Ute, both being basically Basin cultures. Before they had horses, they would surround a herd of bison and close in on them. In the winter, bison were pursued on snowshoes (Lowie 1924). The animals were run into deep snow, where they would flounder and be killed. Mountain sheep were hunted with dogs; antelope were stalked by single hunters or in surrounds. According to Lowie (1924), small game comprised a large part of Shoshone subsistence, including ground hogs, squirrels, rabbits and fish. Shimkin (1947:265) gives basically the same information. Bison,

fish, elk, deer and beaver were staples and antelope, rabbit, mountain sheep, marmot and sage hen were hunted. Fish were caught with weirs, dams and fishtraps. Dogs were never eaten. Murphey and Murphey (1960:332-3) note that the Shoshone placed considerable dependence on elk, deer, moose, rabbits and other animals during the winter. Consequently, winter locations were chosen with proximity to game in mind. Lowie (1924) reports that the same vegetable foods were eaten by the Shoshone as by the Utes. Women gathered roots in the fall to store for winter. Berries and seeds were also gathered and stored. According to Shimkin (1947:269), the following plant foods were eaten by the Shoshone: roots, camas, wild onions, currants, rose berries, hawthornes, gooseberries; the leaves and pistils of honey plants, gilia and cinquefoil; and the seeds of thistles and sunflowers.

The Cheyenne and Arapaho were horticulturalists before adopting a Plains mode of subsistence. They continued planting some crops, by most accounts, until at least 1865. According to Grinnell (1962:254), the Cheyenne grew crops "...until the active wars of 1868 to 1878 made agriculture no longer possible." It is unlikely that the Cheyenne or Arapaho practiced any substantial form of horticulture in North Park, if at all, due to the adverse conditions in the Park.

Both Cheyenne and Arapaho subsistence patterns were based on the bison, which was used not only for food, but for everything from tepee covers to projectile points. Elk and antelope were killed both by enclosure and by a noose hunt from trees in forests (Grinnell 1962). Fish were caught in nets, pens, weirs and traps. Hilger (1952:171) cites DeSmet's observation concerning the Arapaho that "...a good hunter

might easily kill...in the course of a day, several cows (bison), deer, a mountain goat, red-tailed and black-tailed duck, an antelope, hares and rabbits." To this list he adds beaver, otter, badger, prairie dog, and different kinds of wild fowl. It was observed in one group that warriors and women did not eat rabbit, for fear they would have too many children (Dorsey & Kroeber 1930:60). Dogs were raised for food, which might help the archeologist distinguyish between Ute and Arapaho occupations in excavations, since the Ute did not eat dogs.

A great amount of vegetable foods were eaten by the Cheyenne and Arapaho as a supplement to meat. Grinnell (1962:250) reports that the Cheyenne used 35 to 40 plants as food, including several lily-type plants, wild licorice, and a root that may be the prairie turnip (Psoralia esculata). According to Elkin (1963:208), various roots and berries were mixed with meat to form a large part of the diet. Hilger (1952:177) adds that buffalo berries, serviceberry, wild cherries and currants were either eaten fresh or sun-dried, and wild roots they called "carrots" and "potato" were boiled and eaten. Mooney (1896:779) observes that pinon nuts were held in great esteem.

Seasonal movements of the Cheyenne and Arapaho were based on bison migrations. Hilger (1952:171) notes that the bison hunt for the Arapaho was an organized community affair, with the entire tribe gathering from their winter quarters and moving to the prairies in the spring. During the winters, the groups abandoned the plains and moved to the shelter of timber along streams. In the spring, the men would build sweat lodges at the first thunder and would use them no more than one year. "The framework...(was) eleven feet in diameter...it faced east...

approximately twenty-five stones, each about equal to two fists, lay in a pile in the center" (Hilger 1952:148). Hilger also notes that men made sweat lodges in the fall. This kind of activity might be one possible explanation for the piles of stones that are occasionally found on sites. According to Grinnell (1962:254), the Cheyenne used stones to hold down tepee edges in the winter when the ground was frozen and pins could not be driven into the ground. He also observes that camps high on the hills and far from streams indicated late winter-early spring occupations, because of standing water on lower ground (1962:254). This, of course, would depend on the area in question.

With the information given above and that available from other sources, such as the Plant Identification Network (PIN) at Colorado State University, a general baseline of potential edible resources is established. Using this baseline, the resource potential of an area such as North Park can be evaluated. The spatial distribution and density of resources is more easily established for wild plant foods than for game in most cases, but it is also more difficult to identify the wild plants used as food by prehistoric populations due to the greater variety.

To summarize, there was considerable seasonal variation in the kinds of food exploited by hunters and gatherers in the kind of environment exemplified by North Park. During the summer and fall, wild plant foods and large and small game made significant contributions to the diet. Scheduling of floral exploitation would be expected in response to the availability of specific plant foods at certain times. Investigation of potential scheduling activities and movements during

specific seasons could not be included in the research design due to limitations of the available data. Subsistence activities during the fall would be oriented towards the preservation and storage of food for consumption during the winter months (Frison 1978:358-361). To this end, game drives probably increased in frequency in the fall, when lower temperatures facilitated preservation and the game had the highest fat content. Exploitation of plant foods was minimal during the winter and there was a primary dependence on stored foods and large game. The spring months were probably the most difficult in terms of subsistence. Stored food would have been mostly eaten, game would be thin and more mobile and most plant foods would not yet be available. One would expect exploitation of secondary food sources not normally eaten during this period.

Settlement Location and Duration

A summary of ethnographic information by Jochim (1976:47-50) indicates that the primary factors influencing settlement location in hunter-gatherer societies are: (1) proximity of economic resources, (2) shelter and protection from the elements and (3) a view for observation of game and strangers. Operationalization of this part of the model requires knowing the spatial distributions of food and nonfood resources. The relative importance of the different resources in determining settlement location is derived from the preceding analysis of patterns of resource use and scheduling. In general, the model predicts that site locations will be closer to less mobile and denser

resources. These tend to be high security, low prestige resources. The resulting spatial organization forms three zones around a site: (1) the immediate site location, which is determined by the availability of shelter, a view, fuel and water; (2) a secondary zone in which are high security, low mobility resources typically exploited by the women of the group; and (3) a tertiary zone of greater radius in which are found the low security, more mobile resources exploited primarily by the men of the group. Based on ethnographic examples, Jochim postulates a radius of approximately 5 miles (ca. 8 km.) for the secondary zone and 15 miles (ca. 24 km.) for the tertiary zone (1976:55). Obviously, these values will vary for different situations and different exploitative systems. It will be noted that Jochim's model is a refinement of the catchment analysis approach developed by Jarman (1972).

Considerable seasonal variation occurs in the distribution of resources, with the greater contrast existing between winter and the warmer months. In the spring, summer and fall, large game are relatively mobile and wide-ranging. In the winter, game distributions are more limited, due to the restrictions on movements imposed by deep snows and the more limited distribution of food. These seasonal variations would have caused corresponding variation in hunting patterns and site locations. During the warmer months, the greater mobility of game would have favored the use of game drives and surrounds. Also, it is likely that camp sites were located relatively far away from big game habitats to avoid scaring the game. During the winter, campsites could be located closer to big game concentrations, since animal movements were more restricted. Also, there was probably a greater emphasis on

the hunting of individual animals by single hunters.

The locations of summer campsites should be determined more by local high densities of wild plant food and small game resources than by big game concentrations, with the highest plant food densities occurring near these sites. Satellite special activity sites would be related to exploitation of secondary food and nonfood resources that were gathered in smaller quantities and could be transported over greater distances.

One consideration important in winter is the availability of fuel. Wood is a relatively bulky resource and is consumed in relatively large quantities. It is likely, then, that winter settlements were located close to fuel supplies. Forested areas around the margins of the Park would be ideal fuel sources but sagebrush in snow-free areas is also a possible source. Snow-free ground is also a consideration for the construction of shelters. In North Park, the only areas consistently free of snow during the winter are ridges, south-facing slopes and the flats northeast of Walden.

The duration of settlement in any one locality depends upon a number of factors, among which are scheduling decisions, resource seasonality and distribution, and the relation of resource density to rate of use. Also relevant is the distinction between base camps and satellite specialized activity sites. Depending on the relative importance of the above factors, a group might decide either to make frequent moves of the base camp or to establish a relatively permanent base camp with a number of specialized activity sites in the surrounding area. In general, relatively permanent base camps should occur in areas with substantial concentrations of one or a few high security resources

and scattered distributions of other resources. In ecotonal situations, the establishment of relatively temporary base camps adjacent to a variety of resources would be expected.

With regard to the distribution of population and the size of population aggregations, the following considerations are taken into account (Jochim 1976:65-71): (1) density and quantity of food and nonfood resources, (2) low cost procurement of resources, and (3) desire for population aggregations as a stimulus for social interaction, at least seasonally. Not mentioned by Jochim is the need for security in situations where there are hostile relations with neighboring groups. The Utes, for example:

> "...traveled in large bands across the Continental Divide to kill bison on the Great Plains. Hunting in this distant country filled with hostile tribes, necessitated an effective war organization and the prowess of large bands. Warfare, especially with the Arapaho and Crow, stimulated the growth of much larger bands than were known elsewhere among the Shoshoneans..." (Zingg 938:134)

One must be careful in generalizing to earlier periods from the ethnographic present. The introduction of the horse markedly increased the mobility of groups and changed other culture patterns. Opler (1963:123-4) notes that the Ute became more aggressive and formed larger groups after the introduction of the horse. This change may have also been caused by the increased mobility of other groups, who were then better able to intrude into surrounding areas.

Yellen has made the observation, derived from his ethnographic

experience among the Bushmen, that there is a consistent relationship between the metrical attributes of a site and group size and the length of occupation (1977:134). Binford, however, points out that there are any number of factors that can invalidate this generalization (1978:358-9), including the different kinds of activities carried out at different kinds of sites. One might look for consistent variation in site size between different site types, based on the assumption that limited activity sites are likely to be smaller than multiple activity sites. Also, comparison of the average sizes of the same type of site during different periods might be instructive, indicating possible temporal changes in the size of groups or duration of occupation.

Use of the number of stone material types in a site as an index of group diversity in North park was presented in the proposal for this project. If only one group used the Park, stone variety would presumably be more limited, while a number of different groups coming into the Park from different areas would be likely to bring in a greater variety of lithic materials. Theoretical problems in developing a useful index of material type variability, however, precluded use of that information in this report.

ESTABLISHING A SITE CHRONOLOGY

In the absence of materials that could be absolutely dated, the only technique available for chronologically ordering the prehistoric sites recorded during the survey was analysis of temporally diagnostic artifact classes. Ceramics are the most useful type of artifact for

this purpose, due to the large potential variation of stylistic attributes. However, sherds were found on only three sites. The only temporally diagnostic artifacts common enough to be useful were projectile points.

There are few, if any, attributes of projectile points that exhibit enough variability to permit a detailed chronological analysis. The attributes that do change through time tend to reflect changes in technology (such as hafting techniques) and function. Technological and functional changes tended to occur relatively slowly, consequently the smallest time periods which we can define are hundreds and thousands of years long. A further complication is that projectile points made during the same time period or even made by the same group of people can exhibit considerable variation.

Surface archeological manifestations pose a separate problem. If diagnostic artifacts representing only one time period are found on the surface of a site, then it is assumed that all other artifacts on the surface of the site were made, used and discarded during that time period. The site assemblage is referred to as a component. If, however, diagnostic artifacts representing two or more time periods are found on the surface, there is no way to assign the non-diagnostic artifacts to a particular time period. These sites are referred to as multicomponent sites but the "components" being referred to can only apply to the diagnostic artifacts, not the non-diagnostic ones.

There are other problems in using surface evidence. Tools made during an earlier period may be scavenged from the surface of a site during a later period, used, possibly retouched and then discarded

again. Livestock moving across a site can collect artifacts in the soil that works up between their hooves and carry them considerable distances before they drop out. Earth moving equipment, off-road vehicles and artifact collectors can also displace surface artifacts. Also, the finding of a diagnostic artifact on a site can sometimes be a chancy business. The site may have been picked clean by arrowhead collectors or early components may not have been exposed.

While the problems and limitations cited above do not necessarily nullify the results of a chronological analysis based on surface evidence, they do suggest a degree of caution in interpreting the results of that analysis. Greater emphasis should be placed on well-defined trends than on more specific, small-scale variations between periods.

The description of chronologically diagnostic artifacts is provided in Chapter 6.

CLASSIFICATION OF SITES

One of the objectives of the present study was to create a classification of prehistoric sites into functionally specific categories presumably reflecting the kinds of activities engaged in on those sites. The result of the classification is a set of site types, with sites in each category assumed to be functionally similar. Analysis of the patterns of association between sites grouped into types and environmental variables has two objectives. The first is acceptance or rejection of the site typology. If patterns of association between

the sites in a category and the environmental variables exhibit considerable variability, then the internal integrity of that category is questioned. Conversely, if two site types relate to the environmental variables in the same way, the distinction between the two types may be artificial or trivial. The second objective is to expand the functional interpretation of individual site types, assuming they have internal integrity, by examining the nature of those variables significantly associated with individual site types. As an example, a site type with sites whose catchment areas exhibit high edible plant biomass values, for example, is probably related to exploitation of that resource.

Two separate methods of site classification were attempted in the present study. Lischka attempted a site classification by conducting a multivariate analysis of the frequencies of artifacts collected from each site. This approach was based on the assumption that the relative frequencies of the functionally defined artifacts found on the surface of a site reflect the kinds of activities carried out at the site. At the same time, a separate classification of the sites was made by Miller. His classification incorporated a distinction between limited activity and multiple activity sites, based on the number of artifact classes recovered from a site. He also distinguished between those sites with features and those without features. It was intended to use the multi-variate analysis as a test of Miller's classification. The multivariate analysis, however, produced inconclusive results, as described in a subsequent section.

One problem that cannot be addressed adequately when dealing with

artifact materials not in stratigraphic context is the likelihood that the non-diagnostic artifacts found on the surface of a multicomponent site are a mixture of artifacts from all of the components. It is possible that each site component might be classified differently if we knew what the artifact and feature assemblages of each component were, particularly if site function varied through time. If site function did vary, our site classification will identify the most complex assemblage in the site, since that assemblage will tend to obscure other assemblages with less internal variability. It is also possible that a series of relatively simple assemblages related to successive components may combine on the surface to produce a composite surface "assemblage" that is more complex than any single assemblage.

One solution to the above problem is to limit any functional analysis to single component sites.

A full discussion of the results of site classification is in Chapter VII.

HISTORIC SETTLEMENT ANALYSIS

The settlement-subsistence model presented above should theoretically apply to the analysis of historic sites as well as prehistoric sites, since the assumption of rational human behavior also applies to European settlement in North Park. The nature of European subsistence systems and culture, however, is different enough to justify separate treatment. Also, the kind of information available for historic sites is considerably different than that available for

prehistoric occupations. Nevertheless, European settlement patterns are assumed to reflect patterns in the availability and distribution of resources and changes in transportation technology. A significant difference between the historic and prehistoric periods is the effect of a national culture and economic system on the historic inhabitants of the Park. Economic activity in North Park, for example, has always been governed by the availability of markets outside the Park.

The historic sites recorded during the North Park Project are few in number and do not permit a full-scale settlement analysis. All that can really be done with the historic sites is to show how they illustrate known trends in economic activities and developments in transportation. A complete description of the recorded historic sites is in Appendix B.

IMPLEMENTATION OF THE RESEARCH DESIGN

A model might be elegant and incisive in developing a theory of human behavior, but it must be operationalized to be really useful in explaining that behvior. In applying the settlement-subsistence model to the prehistory of North Park, a number of variables were defined that quantified in some way various aspects of the model. These variables can be grouped generally into environmental and artifact categories and are treated mainly as dependent variables in the analysis. Independent variables used in the analysis include temporal periods and site type.

The Environmental Data

The relatively homogeneous environment of the floor of North Park required a more detailed analysis of floral and faunal variation than is usually found in archeological reports. As has been noted in Chapter 2, there is no information at present on the paleoenvironments of North Park and descriptions of the present environment were used throughout the analysis.

The Soil Conservation Service (SCS) was the main source of information on the natural vegetation of North Park. The SCS has defined a number of vegetation zones, termed Range Sites, each of which is unique with respect to types and quantity of vegetation. The floral makeup of each range site is described in terms of the "potential natural vegetation," which excludes all introduced species and the effects of overgrazing or other external influences. Thus, the list of species for each range site and the percent by weight of each species ideally describes vegetational distributions before they were affected by European settlement and activities. Range site distributions show a close correlation with the distribution of soil types. A map of the range sites in North Park was not available at the time of the analysis and it was necessary to extrapolate from soil distributions.

With the range site data in hand, those plants that were potential food sources for the prehistoric inhabitants of the Park were identified by consulting the Plant Identification Network at Colorado State University and several other bibliographic sources.

Information on faunal distributions in North Park was obtained

primarily from the Colorado Division of Wildlife. Also used was an assessment from the Colorado Division of Wildlife. Also used was an assessment made by the Soil Conservation Service of the habitat potential of ech range site for various species of large and small game. This assessment is currently undergoing revision but has not been completed yet.

Environmental Variables

The environmental variables used in the analysis can be divided into two groups: (1) those relating to the immediate site environment, and (2) those characterizing the vegetational and faunal makeup of the site catchment area.

The first group of variables includes: (1) site elevation above sea level, (2) horizontal distance to nearest permanent water, (3) vertical distance to nearest permanent water, (4) on-site slope and (5) overview. Variables 1, 2, and 3 were measured in meters and variables 4 and 5 were recorded in degrees. A permanent water source is defined as any stream or river marked on the USGS 7 1/2' topographic map by a solid, blue line. Springs or natural lakes, if labelled, were also considered permanent water sources. On-site slope was measured in degrees using a Brunton compass. Readings were taken by standing at the highest point on the site and shooting to the lowest point, or vice versa. Site overview was measured in degrees and is defined as that part of the 360° circle around a site in which there is an unobstructed view of the landscape out to a distance of at least 500 meters. A site

on a hill overlooking a large plain on all sides would have an overview of 360°, while the overview of a site in a small basin would be zero. An ideal measure of the view from a site would be the area of land visible from a site within a certain radius but this is a difficult measurement to make in the field. The technique used was to place a circle with a 500 meter radius drawn on mylar on a USGS 7 1/2' topographic map, centered on the site being measured. Overview was recorded in directions where contours were decreasing away from site locations out to 500 meters. Overview measurements are probably accurate to within 5 degrees. One problem is that trees, which might obscure overview, might not be indicated on the map. This, however, was not a relevant consideration on the treeless floor of the Park.

The second group of environmental variables requires definition of a site catchment area. Jochim proposed a radius of about 8 km. for the secondary zone of high security-low prestige resources. We intended instead to use circles with radii of 1, 2 and 3 km. from a site, based on the assumption that resources at greater distances from a site have progressively less weight in deciding where to locate one's activities. This procedure, however, proved to be more time consuming than anticipated. Individual soil types on the maps provided covered relatively small areas. Each of these areas had to be measured with a planimeter and then combined into range sites. A range site map was being prepared by the SCS but was not published in time to be used in the analysis. It was learned in 1978 that COMARC Design Systems has digitized the soil distributions of Jackson County, thus allowing one to get lists of soil areas within any specified area by computer. The

procedure, however, is relatively expensive and there was no money in the budget for that purpose. Instead, range site areas in catchment circles of 1/2 km. radius were measured for all prehistoric sites. The justification for this procedure is that the density of resources in the immediate proximity of a site will carry greater weight than those at greater distances. As will be seen, the results of the analysis tend to support this assumption. A better test would be to use catchment circles with progressively greater radii out to about 8-10 km. and this is suggested for future research.

The areas of each of the range sites occurring within the catchment circle were treated as separate variables. The range sites, which are described in Chapter 2, are (1) valley bench, (2) dry mountain loam, (3) dry mountain loam/valley bench, (4) bald slopes, (5) salt flats, (6) clay pan, (7) mountain loam, (8) mountain shale, (9) deep clay loam, (10) mountain meadow, (11) alkaline slopes, (12) woodland, and (13) rock/badland. Range sites not occurring in any of the site catchment circles were not included in the analysis. Woodlands and rock/badland are not, strictly speaking, range sites but are referred to as such in the analysis for the sake of brevity. The areas of the range sites were recorded in hectares. Individual range site areas were used as separate variables because range sites are significantly different in terms of vegetational composition and it was felt there might be patterns of range site selection either between site types or through time.

The number of different range sites in a catchment area was used as a measure of environmental diversity in the neighborhood of a site. The greater the number of range sites within the catchment area, the greater

the environmental diversity. The value of this variable for the 151 prehistoric sites used in this analysis varied from 1 to 8.

The edible biomass densities in kg./hectare/year for grasses, forbs, and shrubs were calculated for each range site as described in Chapter 2. These densities were used to calculate the edible biomasses of grasses, forbs and shrubs within the catchment areas. Each of these biomasses was used as a separate variable and another variable - total edible biomass - is the sum of these. The values of these variables are in kg./year.

The catchment area for each site was evaluated with respect to its potential for large game and small game. The Soil Conservation Service has evaluated the potential carrying capacity of each range site as high, medium, low or not applicable for various species of large and small game, including bison. Values of 3, 2, 1 or 0 were given respectively to the high, medium, low and not applicable evaluations for each range site. The values for bison, elk, deer and antelope were added together to obtain a composite value for big game for each range site. A composite small game value was obtained for each range site by adding together the individual values for upland game birds, waterfowl, sage grouse, marmot, cottontail rabbit, jackrabbit and snowshow rabbit. The area of each range site within a site catchment circle was multiplied by the composite big game and small game values for that range site. These were then added together to get two numbers, one representing the big game potential of the site catchment area and the other representing the small game potential. These numbers are based on an ordinal evaluation scale but were included in the statistical

analysis as interval variables. While this violates several statistical assumptions, it is felt that inclusion of the variables in the analysis is valid for making general comparisons between sites and site types with regard to big game and small game potentials.

Values for each of the environmental variables used in the analysis are presented in Appendix C.

Artifact Variables

The following artifact variables were used in the statistical analysis: (1) projectile points, (2) utilized projectile points, (3) manos, (4) metates, (5) cutting tools, (6) scraping tools, (7) sawing tools, (8) utilized flakes (undetermined function), (9) utilized bifaces (undetermined function), (10) non-utilized bifaces, (1) choppers, (12) endscrapers and (13) hammerstones. These are presumed to be functional categories and are based on morphological characteristics and kind and degree of use-wear. The variables are somewhat different than the artifact categories defined in Chapter 6. The utilized/retouched flakes, for example, were divided into scraping, sawing and cutting tools, based on type of use-wear. Those utilized flakes for which specific types of use-wear could not be identified were also added to the scraping, sawing and cutting tool variables. Patterned side scrapers were added to the scraping tool category because only three were found and thus could not be used as a separate variable in the statistical analysis. The miscellaneous ground stone category was not used in the analysis for the same reason nor were gravers. Ceramic

frequencies were not used in the analysis because ceramics were found at only three sites.

Frequencies of the artifact variables used in the statistical analysis are given by site in Appendix H.

Statistical Techniques

Three different statistical techniques were used to analyze the North Park data: (1) factor analysis, (2) F tests and (3) T tests. Short descriptions of these techniques are given below.

Factor analysis is one of several multivariate statistical techniques used to discover and summarize patterns of common variance in the correlation matrix of a set of data. It has been used by Roper (1974) to investigate prehistoric settlement patterns in the Lower Missouri area and by Lischka (1978) to analyze patterns of common variance between functionally defined ceramic types at a prehistoric site in Mesoamerica.

The SPSS factor analysis program and the BCTRY system of multivariate analysis were used in the present study. An attempt to use factor analysis to generate a set of prehistoric site types from the North Park artifact variables was unsuccessful, probably because of low artifact frequencies.

The SPSS factor analysis program and the BCTRY multivariate analysis program in the University of Colorado computer library were used in the analysis. An SPSS PA1 principal components analysis was performed first, followed by a PA2 analysis, both with varimax rotation.

In each case, only two factors with eigenvalues greater than 1.0 were produced. The first factor had high loadings on those artifact classes with the highest frequencies and the second factor had high loadings on manos and metates. A check of these results using the BCTRY multiple group method produced 3 clusters with reliability coefficients of 0.8, 0.66 and 0.59. A reliability coefficient less than 0.75 is regarded as unacceptable. The first cluster, like the first factor of the SPSS factor analysis, had high loadings on those artifact classes with the highest frequencies and is assumed to be a mathematical factor without functional meaning. Communality estimates for each artifact type produced by the BCTRY analysis varied between 0.61 and 0.11 with most less than 0.5. A visual inspection of the Pearson's r correlation matrix produced by the program revealed that most correlations were less than ± 0.30. What this means is that the degree of correlation between variables and the amount of common variance in the matrix was too low to provide reliable results using multivariate techniques. This is probably due to the generally low frequencies and large number of zero values for the artifact variables used in the analysis. In an effort to eliminate the effect of high frequency variables, the artifact frequency matrix was reduced to a presence/absence matrix and this matrix was then factored using the PA1 and PA2 options of the SPSS factor analysis program. The results were as inconclusive as the results of the factor analysis of the artifact frequency matrix.

A factor analysis of the range site variables was also run to see if there were any patterns relating to selection of specific range sites by the prehistoric inhabitants of North Park. The other environmental

variables were not included in this analysis. The results of this analysis indicate that, while there may be significant correlations between pairs of range sites, there is little common variance exhibited by groups of more than two range sites. A BCTRY multiple group cluster analysis of the range site data, for example, produced only one cluster or factor. The reliability coefficient of this cluster was 0.04, much lower than the conventional cut-off point of 0.75. An examination of the correlation matrix revealed few correlations between range sites greater than ±0.4 and most were less than ±0.2. There was also a preponderance of negative correlations in the matrix, which is caused by the fact that the range site values for each site catchment area form a closed array; i.e., the range site areas within each catchment circle add up to the same number which is the total area of a circle with a 1/2 km. radius. In other words, the range site variables are not independent of each other. This is not a serious problem if there are enough variables but evidently 13 is not enough.

The multivariate analysis of artifact variables and environmental variables, then, did not reveal any clearcut patterns of common variance save for a few correlations between pairs of interdependent variables.

The F test is essentially a means of testing the significance of variability in a set of data. The variance of the means of a group of samples for a particular variable is computer and compared with the variance of the means of other groups of samples to see if the variance between groups is greater than the variance within groups (Weinberg and Schumaker 1974:319-342). For example, we may wish to know if variation in the frequencies of manos found in sites of different time periods is

significant. This is done by determining whether there is greater variation in mano frequencies between sites of the same period than the variation within time periods. If there is more variation between periods, then the differences in mano frequencies between different periods is significant. It must be emphasized that the F test is only a measure of the significance of the scatter of scores within groups. We could not say, for example, that the number of manos found in Late Prehistoric sites was significantly greater or less than the number found in Middle Archaic sites, using only the F test. To test the significance of differences between individual groups means the T test is used.

There are two different SPSS programs that can be used to run F tests. Subprogram BREAKDOWN produces F tests if Statistic 1 is requested, along with sums, means, standard deviations and variances of variables. The program also prints the significance of the computed F value, although this is not stated in the SPSS manual. Subprogram ONEWAY also generates F tests but sums and means of variables are not printed.

The T test is based on the T distribution of means of samples of a poulations, and determines whether the difference between the means of two samples is significant. We might want to know, for example, whether the average number of manos found in Late Prehistoric sites is significantly greater or less than the average number of manos found in all other dated sites. The T test procedure used in this analysis was to compare the mean of a variable for the sites of one temporal period with the mean of that variable for all other single component sites.

The variable mean for all sites in one site type was also compared with the variable mean for all other sites. A problem with this procedure was recognized during the interpretation of the results. If a particular variable increases in frequency through time, for example, there will be low values of that variable for early periods, medium values for the middle periods and high values for late periods. Comparison of the low mean for early periods with the mean of all other sites may show significantly different means, as may comparison of late period high means with all other sites. The means of the middle periods, however, will be compared with the mean of high frequency and low frequency sites, and there is likely to be no significant difference between these means. The alternative procedure is to compare the means of individual periods or site types with the means of other individual periods or site types. This was not done due to the high number of T tests produced and large amount of computer time needed. In retrospect, it appears that additional T tests of those variables, site types and periods of particular interest could be run based on the results of the procedures described above. These additional tests would probably not change the interpretations but might provide greater support for them.

Strictly speaking, one should not use the T test on variables for which the F test indicated no significant differences with respect to temporal periods or site types. T tests, however, were run on all variables in the analysis and patterns of variation were revealed that were not indicated by the F test.

The 0.05 rejection level of significance was used for both the F tests and T tests. Significance levels between 0.05 and 0.1 were also

included in the interpretation of the results but less weight was placed on these results.

Subprogram T-TEST of the SPSS program was used to run the T tests.

FIELD AND LABORATORY METHODS

The field and laboratory methods used in the North Park Project were designed to complement the principal topics of the research design. The historic sites recorded were dealt with by relating them to the documented history of North Park. Also important was the necessity of providing information useful to the agencies involved in managing the cultural resources of the area.

The field personnel were divided up into three crews, each consisting of a crew chief and two assistants. Specific areas of the survey blocks were assigned to each crew each time a previously assigned area was completed. Each crew walked transects from one end of a given survey area to the opposite end. The length of transects varied between 1/2 and 1 1/2 kilometers, depending on the size of the survey area. The distance between each individual crew member was maintained at approximately 20-25 meters. A spacing of 15-20 feet was specified in the proposal. The close spacing was attempted during the initial stages of the first field season until it became apparent that the project would never be finished on schedule if it was maintained. It is likely that isolated finds were missed using the wider spacing but spot checks in several areas indicate that few, if any, sites detectable on the surface were missed. Once one transect was completed within a survey area, a second transect was initiated going in the opposite direction by

moving the crew 20-25 meters beyond the outside edge of the previous transect. This method minimized overlap of transects while maintaining complete ground coverage.

Cultural manifestations were recorded either as sites or isolated finds. A site was defined as any locality with: (1) six or more flakes, (2) three or more flakes and a patterned tool, (3) two or more patterned tools, or (4) one or more features. Any manifestation that did not meet any of these criteria was defined as an isolated find. The distances between artifacts is an important consideration. For example, are two flakes located 50 meters apart to be treated as two isolated finds or one isolated find? This depends partly on the topography of the area. If the flakes were located on opposite sides of a stream drainage, they would be treated as two separate isolated finds. If they were both found on a hilltop, however, they might be recorded as one isolated find. The important question is whether they represent the same or different cultural events. This cannot usually be determined from surface evidence, however, and practical expedients must be used.

When any evidence of cultural activity was found by a crew member during the traverse of a transect, all members of the crew intensively investigated the immediate area for other cultural evidence. This intensive investigation continued out to a distance of at least 200 meters beyond the limit of the artifact and feature distributions. If the manifestation was recorded as a site, a site datum was marked with a yellow plastic cap on a length of rebar driven into the ground. The plastic cap was marked with the Smithsonian site number. If more than one datum point was required on a site for mapping purposes, each point

was staked in the same manner and the number of the datum point (from 1 to n) was also inscribed on the cap. Although some sites required more than one full day for a crew to fully record, most sites could be mapped and described in about one hour by a three person crew. A State of Colorado site form was filled out for each of the prehistoric and historic sites. All blanks of the site forms, except for UTM's, were filled out in the field, and crew members were encouraged to enter in field notebooks their impressions concerning site setting, possible site functions and relations with neighboring sites. A sketch map of the site was made by one of the crew members, showing the location of the datum in relation to topographic features, the limits of the site and general locations of features and artifact concentrations. During the surface examination, the locations of artifacts, flakes and features were flagged. After the flagging operation was finished, one crew member was stationed at the datum with a Brunton pocket transit and the crew supervisor examined each of the flagged items. A transit and 100 meter tape were used to measure artifact locations on several sites with large numbers of artifacts and features. The paced distance and azimuth from the datum was recorded for each patterned tool, utilized/retouched flake, feature and concentration of non-utilized flakes. The general location of individual non-utilized flakes was visually estimated and indicated on the sketch map by an x. As the distance and direction of each patterned tool and utilized/retouched flake was recorded, it was placed in an envelope and given a number (from 1 to n for each site). Features and flake concentrations were also individually numbered. The recorded locations of artifacts and features were then used, in

conjunction with the sketch map, to produce a finished site map in the laboratory. The site location was marked on a field copy of a USGS 7 1/2' topographic map. Site location was also determined by measuring the azimuths from the site to at least two prominent topographic or cultural features appearing on the USGS topographic map, such as a prominent hill or a ranch building. At least three photographs, two black and white and one color, were taken of each site and its surroundings. The location from which each photograph was taken and the direction in which it was taken was noted on the sketch map. Individual maps were made of each feature exhibiting internal structural detail, such as circular stone structures ("tipi rings") and stone-ringed hearths.

All numbered artifacts and a number of non-utilized flakes representing stages of artifact manufacture and material types were collected.

Isolated finds (IF's) were recorded on a one page form drafted for the project. The data recorded on these forms included: (1) IF number, (2) artifact description and sketch, (3) description of area, (4) legal description of area including UTM designation, (5) property owner, (6) USGS quad map name, (7) crew number and (8) date recorded.

An attempt was made during the first part of the survey to measure the density of artifacts on a site by collecting 1 x 1 meter squares but they often contained only 1 artifact. Also, artifact density was often so variable that the 1 x 1 meter squares were not an accurate indicator of overall artifact density. As a result, this technique was soon abandoned.

Laboratory activities were centered on a chronological and functional analysis of artifacts recovered from the recorded sites. This analysis was based on artifact morphology and examination of use-wear patterns. The artifacts were initially classified according to basic morphology as flakes, bifaces, cores, projectile points, ground stone or hammerstones. These basic categories were then broken down further with reference to presence and kind of use-wear and more detailed morphological comparisons. Appendix A of this report is the coded attribute list for each of the basic categories named above. The coded attributes of each artifact were then punched on computer cards for further analysis.

Several limitations of the functional artifact classification should be mentioned here. Only those use-wear attributes relating to edge damage visible at low magnification (6x-12x) were used in the analysis. Microflaking, which consists of flake scars produced on tool surfaces by edge attrition during use (cf. Tringham, et al., 1974:175), was the primary attribute observed. These flake scars are generally more visible under low magnification than other use-wear attributes such as striations and polish. It is therefore possible that some flakes that may have been used in tasks that did not produce microflaking escaped detection.

A second possible limitation is that four researchers were involved in the artifact analysis and each may have developed somewhat different biases with regard to identification of different types of use-wear, even though they used the same coding forms and the same set of definitions of microflaking provided by Tringham, et al. (1974). It is

expected, however, that a general level of consistency was maintained throughout the analysis.

A further limitation is the problem of correlating a particular type of edge damage with a specific task. Frison (1978), for example, warns of the difficulty of analyzing working edges of tools and detecting task-specific kinds of use-wear. He cites bison butchering experiments which indicate that the same tool could have been used for a variety of tasks. Other subsistence activities requiring the use of stone tools may have had an equally complex range of tasks which could have been performed using the same artifact.

A final consideration is that all artifacts recovered during the project are surface finds. Movements of livestock across sites, erosion processes and human distrubance, for example, can produce edge damage that obscures use-wear patterns.

V. The Data Base

V. THE DATA BASE

by Joseph J. Lischka

LOCATION OF SURVEY AREAS

The 25,000 acres surveyed were distributed among 17 survey blocks, which are illustrated in Figure 5 and listed in Table 9. The majority of the survey blocks are located in two areas: (1) east-central North Park along the Michigan and Canadian Rivers, and (2) southwestern North Park in the general vicinity of Coalmont, Hebron Sloughs and Spicer and Buffalo Peaks. Additional survey blocks were surveyed near Case Flats and on Owl Ridge in the central part of the Park. Approximately 50.4% of the area surveyed is in the southwestern part of the Park, 45.1% is in the Michigan-Canadian river system, 4.2% of the area is located near Case Flats and 0.3% is on Owl Ridge.

The original area to be inventoried as specified in the contract totaled 28,600 acres. The survey areas were designated on 7 1/2' topographic maps provided by the BLM at the beginning of the project in 1977. Prior to the 1978 field season, areas in the Spicer Peak-Buffalo Peaks area that were originally marked for survey were deleted by the BLM and additional areas in the Hebron Sloughs area were added. A few small areas in the Michigan-Canadian drainage were also deleted. Some areas under private ownership near Coalmont and Hebron Sloughs were deleted, due to problems encountered in gaining access. The survey blocks near Case Flats and on Owl Ridge were added during the 1978 field season. These areas were selected by the principal investigator with the approval of the BLM District Archeologist to aid in interpreting

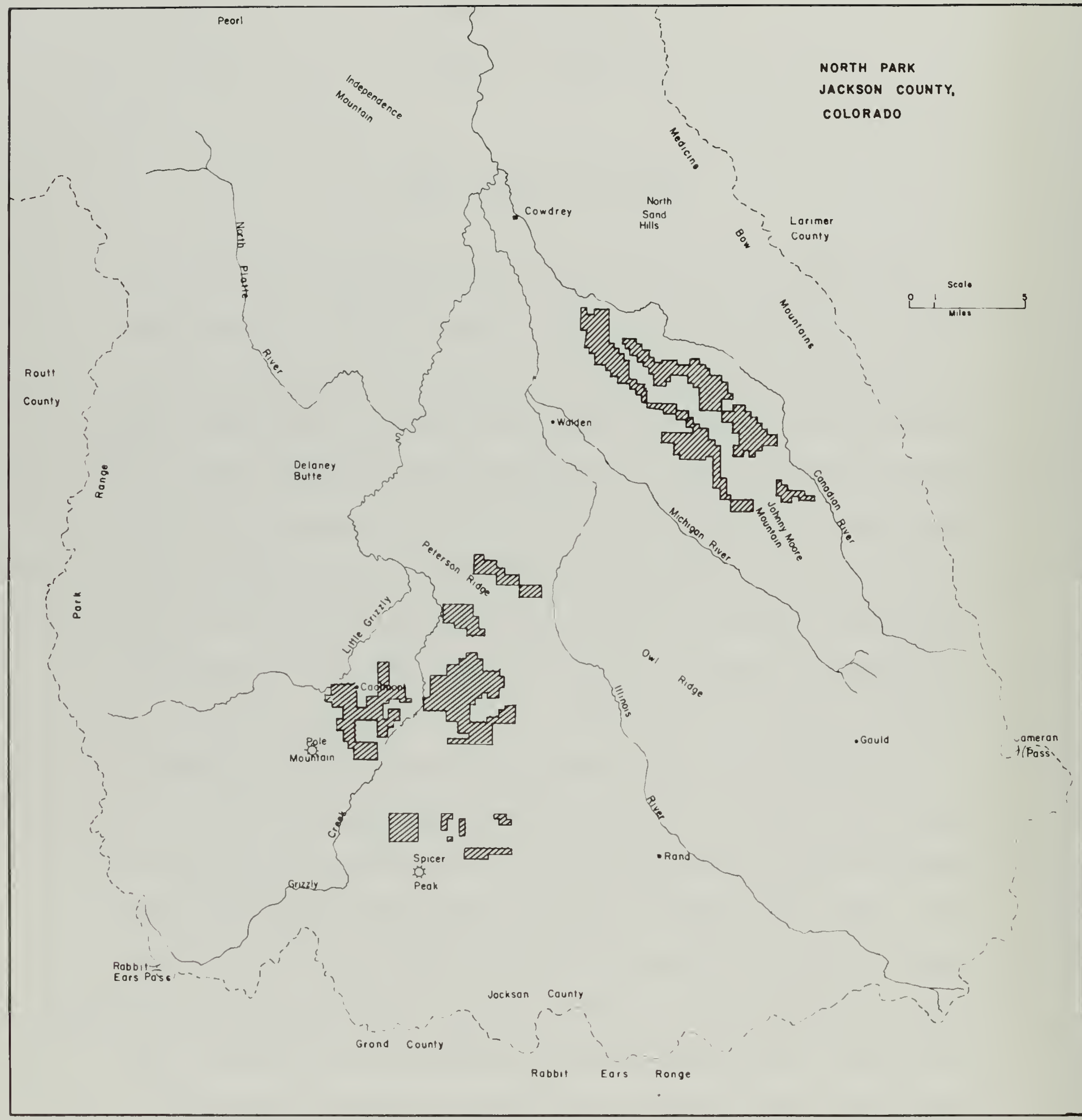

Figure 5. Location of Areas Surveyed

TABLE 9

LEGAL DESCRIPTIONS FOR SURVEYED PARTS OF NORTH PARK

Township and Range	Section	Part of Section Surveyed
6N,80W	22	SE 1/4 NE 1/4, E 1/2 of SE 1/4, NW 1/4 SW 1/4, N 1/2 and SW 1/4 of NW 1/4
"	24	NW 1/4 and S 1/2 of NE 1/4, NE 1/4 NW 1/4
"	25	N 1/2 SW 1/4, N 1/2 SE 1/4, part of SE 1/4 SE 1/4
"	26	S 1/2 of section
"	27	NE 1/4 NW 1/4
"	35	part of NE 1/4 NW 1/4, W 1/2 NW 1/4 NE 1/4
"	18	S 1/2 SW 1/4 SE 1/4, S 1/2 SW 1/4 SE 1/4 SE 1/4, S 1/2 SE 1/4 SE 1/4 SE 1/4
"	19	E 1/2 NE 1/4, E 1/2 SE 1/4, W 1/2 SW 1/4 SW 1/4, part of SW 1/4 NW 1/4 SW 1/4
"	20	entire section
"	29	N 1/2 NE 1/4, N 1/2 NW 1/4
"	30	NE 1/4 NW 1/4, NW 1/4 NE 1/4, most of NE 1/4 NE 1/4, part of SW 1/4 NE 1/4 and SE 1/4 NW 1/4
"	5	NE 1/4, N 1/2 NW 1/4
6N,81W	1	all but S 1/2 SE 1/4 and S 1/2 SW 1/4
"	2	NE 1/4 NE 1/4
7N,79W	13	N 1/2 NE 1/4 NW 1/4, S 1/2 NW 1/4 NE 1/4, NE 1/4 SW 1/4 NE 1/4, NW 1/4 SE 1/4 NE 1/4, W 1/2 NE 1/4 SE 1/4 NE 1/4, SE 1/4 SE 1/4 NE 1/4, S 1/2 SW 1/4 NE 1/4 NE 1/4
"	12	S 1/2 SW 1/4 SE 1/4 SW 1/4
7N,80W	2	W 1/2 SW 1/4
"	3	all but SW 1/4 SW 1/4
"	4	E 1/2 NE 1/4, NE 1/4 SE 1/4
"	11	N 1/2 NW 1/4
"	13	SW 1/4 SW 1/4
"	14	SW 1/4, S 1/2 SE 1/4, all of NE 1/4 except NW 1/4 NE 1/4
"	15	S 1/2, all of NE 1/4 except NW 1/4 NE 1/4
"	18	SW 1/4
"	19	all but NE 1/4
"	20	W 1/2 SW 1/4
"	21	all but W 1/2 NW 1/4 and W 1/2 SW 1/4
"	22	entire section
"	23	all but SW 1/4 SE 1/4
"	24	NW 1/4, W 1/2 SW 1/4
"	25	SE 1/4, all of Ne 1/4 except N 1/2 NW 1/4 NE 1/4 and N 1/2 NE 1/4 NE 1/4, NE 1/4 SW 1/4, SE 1/4 SW 1/4, all of SW 1/4 SW 1/4 except N 1/2 NW 1/4 SW 1/4 SW 1/4 and N 1/2 NE 1/4 SW 1/4 SW 1/4

TABLE 9, Page 2

LEGAL DESCRIPTIONS FOR SURVEYED PARTS OF NORTH PARK

Township and Range	Section	Part of Section Surveyed
7N,80W	26	NW 1/4 Nw 1/4, SE 1/4 SE 1/4
"	27	entire section
"	28	all of N 1/2 except NW 1/4 NW 1/4
"	29	N 1/2 NW 1/4
"	30	SE 1/4, W 1/2 SW 1/4, all of NW 1/4 except SE 1/4 NW 1/4
"	31	NW 1/4, NW 1/4 NE /4, N 1/2 SW 1/4
"	34	S 1/2 SE 1/4, S 1/2 SW 1/4, NE 1/4
"	35	entire section
7N,81W	13	E 1/2, SE 1/4
"	23	S 1/2
"	24	E 1/2 NE 1/4, E 1/2 SE 1/4
"	25	all but NW 1/4
"	26	all but SW 1/4
"	27	NE 1/4 NE 1/4
"	35	E 1/2, E 1/2 NW 1/4
8N,77W	6	S 1/2 SE 1/4, all of SW 1/4 except SW 1/4 SW 1/4
8N,78W	3	SW 1/4 SW 1/4
"	4	all of NE 1/4, E 1/2 SE 1/4
"	10	E 1/2 NW 1/4, NE 1/4
"	11	NW 1/4 NW 1/4
"	1	SE 1/4, NE 1/4 SW 1/4, E 1/2 NW 1/4, SW 1/4 NE 1/4
8N,79W	30	N 1/2
8N,80W	14	S 1/2 SW 1/4
"	23	N 1/2
"	24	S 1/2, SW 1/4 NW 1/4
9N,78W	5	S 1/2 SE 1/4
"	6	S 1/2 SE 1/4, SE 1/4 SW 1/4
"	7	all of SW 1/4 except SW 1/4 SW 1/4, N 1/2, NW 1/4 SE 1/4
"	8	N 1/2, all of SE 1/4 except SW 1/4 SE 1/4
"	9	SE 1/4, all of NW 1/4 except NE 1/4 NW 1/4
"	10	SW 1/4 SW 1/4
"	15	all of NW 1/4 except NE 1/4 NW 1/4, S 1/2 SE 1/4
"	18	S 1/2
"	19	N 1/2 NE 1/4
"	20	NW 1/4, SW 1/4 NE 1/4, all of SE 1/4 except SW 1/4 SE 1/4
"	21	S 1/2 SW 1/4
"	22	E 1/2 SE 1/4, NE 1/4 NE 1/4

TABLE 9, Page 3

LEGAL DESCRIPTIONS FOR SURVEYED PARTS OF NORTH PARK

Township and Range	Section	Part of Section Surveyed
9N,78W	23	all of NW 1/4 except NE 1/4 NW 1/4, SW 1/4, all of SE 1/4 except NE 1/4 SE 1/4
"	25	NW 1/4
"	26	N 1/2, NW 1/4 SE 1/4, NE 1/4 SW 1/4
"	28	all except N 1/2 and SE 1/4 NE 1/4
"	29	entire section
"	30	NE 1/4
"	32	N 1/2 NE 1/4, NE 1/4 NW 1/4
"	33	N 1/2 NW 1/4, E 1/2 SE 1/4, E 1/2 NE 1/4
9N,79W	1	all of SE 1/4 except Ne 1/4 SE 1/4, all of SW 1/4 except SW 1/4 SW 1/4, all of Nw 1/4 except NE 1/4 NW 1/4
"	2	all of NE 1/4 except SW 1/4 NE 1/4
"	3	SE 1/4, NE 1/4 SW 1/4, SW 1/4 NE 1/4, NW 1/4
"	10	N 1/2 NE 1/4
"	11	NW 1/4, S 1/2 NE 1/4, NE 1/4 SW 1/4, SE 1/4
"	12	SW 1/4 SW 1/4, all of NE 1/4 except SW 1/4 NE 1/4
"	13	all of NW 1/4 except SW 1/4 NW 1/4, SW 1/4 NE 1/4, S 1/2 NW 1/4 NE 1/4, N 1/2 NW 1/4 SE 1/4, SE 1/4 SE 1/4, S 1/2 NE 1/4 SE 1/4
10N,79W	13	SW 1/4 SW 1/4
"	24	NW 1/4
"	27	S 1/2 SE 1/4, SE 1/4 SW 1/4
"	28	SE 1/4 SE 1/4
"	33	E 1/2 NE 1/4, NE 1/4 SE 1/4
"	34	entire section

patterns of prehistoric occupation in the entire survey area. The 25,100 acres actually surveyed is 3,500 acres less than the total specified in the contract, due primarily to a much higher site density than expected.

Problems Encountered

The primary problem encountered during the North Park Project was a site density about three times higher than anticipated. To compensate for the significantly greater amount of time needed to record sites, process site forms and analyze the artifacts, the acreage surveyed was reduced to 25,100 acres from the 28,600 acres specified in the contract. Also, there were insufficient funds and time to fully analyze the isolated finds collected during the project.

There was generally no problem in gaining permission to survey privately owned land. One landowner, however, flatly refused permission to survey his land. Another landowner refused to give permission to survey during the 1977 field season but his brother let us on the land in 1978. Another landowner gave his permission in 1977, provided we didn't pick anything up, but refused to let us continue surveying his land in 1978.

There was some initial confusion during the 1977 field season with regard to the definition of isolated finds and the procedures used in recording them. During this period, 16 general collections of isolated flakes from sections or parts of sections were made, rather than recording the flakes as individual isolated finds. It was also decided,

upon review of the site and isolated find forms, that four of the isolated finds should have been classified as sites. They were reclassified and site forms were filled out from the information contained in the IF forms and from field notebooks. Those sites are 5JA328, 329, 330 and 331. Photographs were not taken at those sites and they have not been staked. Isolated finds in all other instances are consistent with the definition of isolated finds (cf. Chapter IV).

The areas surveyed during the project were selected with regard to their potential for subsurface coal deposits. Consequently, the survey areas do not consitutue a random sample of North Park nor are all environmental zones in the Park equally represented in the sample. Woodland zones are underrepresented and no areas above timberline were surveyed. Irrigated hay fields constitute about 20% of the Park floor and include almost all floodplains along the major watercourses. These fields probably include entire natural microenvironments that were probably important resource areas in prehistoric times. Because the irrigated fields are generally privately owned and most of the surveyed area is on BLM land, only a small proportion of the irrigated land was included in the survey. A further problem is that ground visibility in the irrigated hay fields is essentially zero, making detection of sites a difficult proposition.

Because of the skewing factors cited above, the highest and lowest elevations in North Park are underrepresented in the survey sample. The sample, then, cannot be considered a statistically reliable basis for examination of the entire range of prehistoric subsistence adaptations in North Park. Also, the 25,100 acres surveyed are about 3.3% of the

Park area, which is a relatively small sample for making predictions about settlement patterns.

Sites Recorded

A total of 151 prehistoric sites were recorded within the survey boundaries. The site numbers of these sites are 5JA6, 47, 143, 144, 146-187, 190-203, 205, 231-235, 237-247, 249, 250, 253-267, 269-274, 276-295, 297-309, 311-322, 324-330. Fourteen historic sites were also recorded. The numbers of these sites are 5JA145, 188, 189, 236, 251, 252, 265, 266, 275, 296, 310, 331, 332 and 405. An historic coin was found at 5JA304, which is otherwise a prehistoric site. Two previously recorded prehistoric sites, 5JA6 and 47, were reinvestigated. In addition, one historic site and two prehistoric sites were recorded outside the survey boundaries. These sites were brought to our attention by local residents.

A total of 1,512 chipped and ground stone artifacts were recovered from the sites recorded, in addition to 5,332 nonutilized flakes and 78 ceramic sherds. Minimal test excavations were performed at two sites, 5JA262 and 276. A total of 322 isolated finds were recorded during the project.

Survey Data

Of the 151 prehistoric sites recorded during the survey, 87 sites each had one or more components ranging in age from Late Paleoindian to

Late Prehistoric times. The 129 dated components were distributed among 61 single component sites and 26 multicomponent sites. Frequencies of components across time periods are: 12 Late Paleoindian, 13 Early Archaic, 23 Middle Archaic, 41 Late Archaic and 39 Late Prehistoric. The temporal breakdown of the 61 single component sites is as follows: 3 Late Paleoindian, 3 Early Archaic, 11 Middle Archaic, 20 Late Archaic and 24 Late Prehistoric.

Sites of the different periods were distributed relatively evenly among the six site concentrations observed within the surveyed areas. These site concentrations are located in the southwest and east-central parts of the Park, partly because the surveyed areas are located in those parts of the Park. There were, however, obvious differences in site density within the survey areas. Site density was particularly low, for example, in and around the North McCallum oil fields southwest of the Canadian River and northeast of Walden. It is difficult to generalize concerning the relation between site locations and broadly defined strata of the environment because the distribution of environmental variables across the floor of the Park is relatively homogeneous. A more fine-grained definition of environmental features did, however, reveal significant site patterning with respect to differences between site types but not between different periods. If it is assumed that there was little change through time of the defined environmental variables, then the analysis suggests that subsistence patterns did not change significantly through time.

The prehistoric sites were classified into eight site types, based on the presence or absence of features, the presence or absence of

architectural remains and the relative number of artifact classes found on the sites (limited activity vs. multiple activity sites). The architectural remains consisted primarily of circular arrangements of stone cobbles ("tipi rings") averaging around three meters in diameter. The features recorded were primarily the remains of hearths or firepits and occasional piles of rocks. Seven sites contained circular stone structures, varying in number from one to over 30 structures per site. Eighty-six sites were defined as limited activity sites and the remaining 65 were classified as multiple activity sites. Of the 151 sites, 96 contained some kind of feature.

Several consistent associations between site types and environmental variables were revealed by the analysis. Multiple activity sites with features but lacking architecture, tentatively identified as base camps, tend to be located at lower elevations and close to water. Small game and some potential plant food (shrub) densities tend to be high around these sites. Multiple activity sites with features and architecture, also identified as base camps, tend to be located at high elevations and relatively far from water. Densities of large game and all potential plant foods are particularly high around these sites. The functional distinction between the two types of campsite is not clear, but it is tentatively suggested that the sites with structures were occupied during the winter and possibly the summer while those campsites without structures were occupied primarily during the summer and fall months. Also, all sites with circular stone structures that have been recorded to date in North Park are located in or near winter concentrations of deer and elk and most are also located

close to woodlands, suggesting winter occupations.

Environmental diversity has often been cited as a desirable characteristic for hunting and gathering peoples. In this study, a high degree of environmental diversity was positively associated only with limited activity sites with features and no architecture. No other environmental variables were associated with the site type, suggesting that these sites represent relatively specialized activities.

No significant differences in site type frequencies between time periods were found, at least for the single component sites. A particularly obvious pattern was that single component sites in each time period were divided approximately equally between limited activity and multiple activity sites.

Testing Operations

It was originally planned to conduct testing operations at those sites where there was some evidence of undisturbed cultural deposits. The intended aim was to obtain temporally diagnostic artifacts from controlled stratigraphic context. The number of sites recorded during the survey, however, was much higher than anticipated, and it was concluded that the remaining time would be better spent surveying as much ground as possible. Nevertheless, testing operations were conducted at two sites to gauge the likelihood of finding undisturbed deposits. Site 5JA262, located in the Hebron Sloughs area, was selected for testing because flecks of charcoal were found eroding out of the side of a cutbank about 40-50 cm. below the present surface, and it was

hoped a charcoal sample could be obtained that was in association with other cultural materials. The hearth from which the charcoal flecks were eroding was found and a sample of charcoal was obtained. No other cultural material was found, however, either in direct or indirect association with the sample. Consequently, the sample has not been dated. A concentration of small, eroded greyware potsherds was found on the surface of 5JA262 about four meters from the test pit as it was being excavated. After the test pit was completed, a second test pit was begun in the sherd concentration area to see if it could be associated stratigraphically with the hearth. Potsherds were found only in the upper 5 cm. of the test pit. The strata in Test Pit 2 could not be positively correlated with those in Test Pit 1.

A 1 x 1 meter test pit was also excavated at site 5JA276, an extensive lithic scatter on a low terrace northeast of Pole Mountain. This was excavated to a depth of 5 cm. below surface to investigate a concentration of bone fragments and teeth thought to be bison. Also present was part of a long bone that appeared to have butchering marks on it. The bone and tooth scatter proved to be a surface scatter and was not eroding out of a subsurface deposit. It is possible that the remains were those of a cow.

A more detailed description of the tests are available in Appendix D.

VI. Artifact Analysis

VI. ARTIFACT ANALYSIS

by Joseph J. Lischka, Mark Miller, & David McGuire

INTRODUCTION

Analysis of the artifacts collected from the recorded prehistoric sites includes a descriptive analysis of the lithic artifacts and ceramic sherds, a chronological analysis of the projectile points and sherds and a functional analysis of use-wear patterns on utilized/retouched flakes and tools.

Lithic assemblages were collected from 150 of the 151 prehistoric recorded sites. Site 5JA326 was not collected at the request of the landowner. An incomplete collection was obtained from 5JA143 for the same reason.

DESCRIPTIVE ANALYSIS OF THE ARTIFACTS

A set of descriptive artifact classes was defined on the basis of differences in the morphological attributes of the lithic artifacts and other attributes related to presumed use-wear patterns The artifacts were first divided into the general categories of (1) flakes, (2) projectile points, (3) cores and core tools, (4) hammerstones, (5) bifaces and (6) ground stone. A set of attributes was defined for each of the general categories that included material type and color, presence and type of striking platform, heat alteration, presence of

cortex, use-wear attributes and various other attributes relating to size and morphology. A code list was drawn up for each of the general categories that included all of the attributes coded (cf. Appendix E). As each artifact was analyzed, the coded attributes were entered on forms and later punched on computer cards. A separate form was used for each projectile point that included an outline drawing of the point.

After the lithic descriptions were completed and card punched, 14 separate artifact classes were defined, based primarily on morphological attributes and the presence or absence of use-wear attributes. It was this set of artifact classes, plus another variable coded for the presence or absence of ceramics, that was used in the descriptive site classification. Each of the artifact classes, including ceramics, is described below and the frequencies of artifacts per site for each of the artifact classes are listed in Table 10.

Non-utilized Flakes

A total of 5251 non-utilized flakes were recovered from the sites. These artifacts represent 75% of the total inventory of recorded cultural items. Flakes are generally defined as pieces of stone which have been removed from a larger mass by the application of force (Crabtree 1972:64). Although flakes can be noncultural in origin, all items recorded as flakes were assumed to be residual lithic material resulting from activities such as tool production or maintenance. Flakes were considered to be non-utilized if their edges or surfaces did not exhibit noticeable modification which might be interpreted as

TABLE 10

SURFACE ARTIFACT INVENTORY

Site No. (5JA-)	Nonutilized Flakes	Util./Ret. Flakes	Patterned End Scrapers	Patterned Side Scrapers	Cores	Core Tools	Hammerstones	Projectile Points	Manos	Metates	Misc. Ground Stone	Nonutilized Bifaces	Utilized Bifaces	Gravers	Ceramics
006	22	0	0	0	1	0	0	0	0	0	0	0	0	0	0
047	19	5	0	0	5	0	0	12	0	0	0	5	1	0	0
143	?	7	1	?	?	?	1	4	1	?	?	3	?	?	?
144	69	3	0	0	0	0	0	3	0	0	0	1	0	0	0
146	15	8	1	0	1	1	0	2	10	2	0	0	1	0	0
147	15	1	0	0	0	0	0	2	2	2	0	6	2	0	0
148	29	5	1	0	0	5	1	2	4	1	0	5	4	0	0
149	36	2	0	0	3	0	0	1	0	1	0	0	0	0	0
150	105	5	0	0	2	0	0	4	1	0	0	1	0	0	0
151	67	1	0	0	0	0	2	2	0	0	0	2	0	0	0
152	11	5	0	0	0	0	0	1	0	0	0	0	0	0	0
153	63	3	0	0	0	0	0	4	0	0	0	2	0	0	0
154	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0
155	70	4	1	0	0	1	0	11	0	0	0	3	0	0	0
156	19	2	0	0	0	0	0	0	0	0	0	0	0	0	0
157	26	5	1	0	0	0	0	0	0	0	0	0	0	0	0
158	24	2	0	0	0	0	0	1	0	0	0	0	0	0	1
159	3	1	0	0	0	0	0	1	0	0	0	0	0	0	0
160	8	0	0	0	0	0	0	1	0	0	0	0	0	0	0
161	2	2	0	0	0	0	0	2	0	0	0	0	0	0	0
162	92	2	3	0	1	0	0	4	1	0	0	1	2	2	0
163	17	7	0	0	3	2	0	1	0	0	0	2	2	0	0
164	13	1	0	0	1	1	0	3	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0
166	136	21	0	0	8	3	1	3	0	1	0	8	3	0	0
167	323	7	0	0	7	4	0	10	0	1	0	12	3	0	0
168	150	8	2	0	2	0	0	1	0	0	0	5	0	0	0
169	12	1	0	0	0	1	0	1	0	0	0	1	0	0	0
170	39	2	0	0	2	1	0	1	1	1	0	1	0	0	0
171	83	4	0	0	0	1	0	1	0	0	0	2	0	0	0
172	59	6	0	1	1	1	0	0	0	0	0	0	0	0	0
173	40	3	1	0	0	1	0	2	0	1	0	1	0	1	0
174	12	2	0	0	1	0	0	0	0	0	0	0	0	1	0
175	48	4	0	0	0	0	0	4	0	0	0	2	0	0	0
176	72	5	0	0	4	1	0	0	0	0	0	2	0	0	0
177	523	28	2	0	6	6	0	13	4	2	0	13	1	0	0
178	52	0	6	0	0	0	0	4	0	0	0	1	1	0	0
179	19	7	0	0	0	0	0	0	0	0	0	2	0	0	0
180	145	2	0	0	0	0	0	1	0	0	0	0	0	0	0
181	18	2	0	0	0	0	0	4	0	0	0	0	0	0	0
182	91	12	1	0	3	1	0	3	0	0	0	4	0	0	0
183	17	0	0	0	1	0	0	0	0	0	0	1	1	0	0
184	54	7	0	0	0	0	0	0	0	0	0	1	1	0	0
185	28	12	1	0	0	0	0	0	0	0	0	0	0	0	0
186	42	0	0	0	1	1	0	1	2	0	0	1	0	0	0
187	38	0	0	0	0	0	0	4	0	0	0	0	0	0	0
190	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
191	65	31	0	0	0	0	0	7	0	0	0	1	0	0	0
192	31	5	0	0	1	0	0	2	0	0	0	1	0	0	0
193	20	1	0	0	0	0	0	1	1	0	0	1	0	0	0

TABLE 10, Continued SURFACE ARTIFACT INVENTORY

Site No. (5JA-)	Nonutilized Flakes	Util./Ret. Flakes	Patterned End Scrapers	Patterned Side Scrapers	Cores	Core Tools	Hammerstones	Projectile Points	Manos	Metates	Misc. Ground Stone	Nonutilized Bifaces	Utilized Bifaces	Gravers	Ceramics
194	13	3	0	0	0	0	0	2	0	0	0	0	0	0	0
195	50	12	0	0	0	0	0	2	0	0	0	2	1	0	0
196	30	4	1	0	0	0	0	0	0	0	0	1	0	0	0
197	13	4	0	0	0	0	0	0	0	0	0	1	0	0	0
198	14	2	0	0	2	3	0	0	0	0	0	0	0	0	0
199	20	2	0	0	6	2	0	0	0	0	0	0	0	0	0
200	12	1	0	0	7	0	0	0	0	0	0	1	1	0	0
201	15	2	1	0	3	1	0	0	0	0	0	0	1	0	0
202	75	4	0	0	3	0	0	3	1	1	0	5	1	0	0
203	52	10	0	0	0	0	0	1	0	0	0	3	0	0	0
205	164	12	0	0	0	0	0	0	0	0	0	5	3	0	0
231	4	9	3	0	0	0	0	4	0	0	0	1	1	0	0
232	14	1	0	0	0	0	0	1	0	0	0	0	0	0	0
233	7	0	0	0	0	0	0	0	0	0	0	0	2	0	0
234	21	1	0	0	0	0	0	3	0	0	0	2	0	0	0
235	6	0	0	0	1	0	0	0	0	0	0	1	0	0	0
237	9	0	0	0	0	0	0	2	0	0	0	0	1	0	0
238	39	3	0	0	0	0	0	6	1	3	0	1	1	0	0
239	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
240	0	1	0	0	0	0	1	2	0	1	0	0	0	0	0
241	7	0	0	0	0	0	0	1	0	0	0	0	0	0	0
242	22	2	0	0	0	0	0	0	0	1	0	0	1	1	0
243	28	2	1	0	1	0	0	1	0	0	0	1	1	0	0
244	6	0	0	0	0	0	0	2	0	0	0	0	0	0	0
245	111	10	1	0	1	0	0	7	1	3	0	11	1	0	0
246	16	1	0	0	0	1	0	0	0	0	0	0	0	0	0
247	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0
249	7	1	1	0	0	0	0	3	0	0	0	0	0	0	0
250	4	1	0	0	1	0	0	1	0	0	0	0	0	0	0
253	10	0	0	0	0	1	0	1	0	0	0	0	0	0	0
254	28	8	1	0	1	1	0	8	1	1	0	1	3	0	0
255	22	3	0	0	3	0	0	1	0	3	0	1	2	0	0
256	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0
257	21	3	0	0	3	2	0	1	0	0	0	2	0	0	0
258	6	1	0	0	0	0	0	0	0	0	0	0	1	0	0
259	9	1	0	2	1	1	0	1	2	0	0	1	0	0	0
260	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0
261	16	1	2	0	0	0	0	3	1	0	0	4	0	0	0
262	16	2	4	0	0	0	0	0	0	0	0	2	1	0	14
263	5	0	0	0	0	0	0	3	0	0	0	0	0	0	0
264	16	2	0	0	0	0	0	0	2	13	0	0	2	0	0
265	9	1	0	0	0	0	0	1	3	4	0	2	2	0	0
267	17	5	0	0	1	0	0	3	1	1	0	0	1	1	0
269	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
270	47	9	0	0	3	1	1	0	1	6	2	5	3	0	0
271	26	1	0	0	1	0	0	0	0	0	0	4	0	0	0
272	4	0	0	0	0	0	0	2	0	0	0	0	1	0	0
273	20	1	0	0	1	0	0	8	2	0	0	2	0	0	0
274	21	4	0	0	0	0	0	3	0	0	1	1	0	0	0
276	37	7	3	0	4	3	4	0	1	1	1	1	0	0	0
277	42	5	1	0	0	0	0	0	0	0	0	1	0	0	0
278	32	2	0	0	0	1	0	0	0	0	0	0	1	0	0
279	36	8	0	0	0	0	2	1	0	0	0	1	0	1	0
280	24	4	0	0	0	0	0	3	1	0	0	0	0	0	0
281	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE 10, Continued

SURFACE ARTIFACT INVENTORY

Site No. (5JA-)	Nonutilized Flakes	Util./Ret. Flakes	Patterned End Scrapers	Patterned Side Scrapers	Cores	Core Tools	Hammerstones	Projectile Points	Manos	Metates	Misc. Ground Stone	Nonutilized Bifaces	Utilized Bifaces	Gravers	Ceramics
282	7	2	1	0	0	0	0	0	0	0	0	0	0	0	0
283	7	0	0	0	0	0	0	0	0	0	0	1	0	0	0
284	27	3	0	0	0	0	0	0	0	0	0	1	0	0	0
285	6	1	0	0	0	0	0	0	1	1	0	1	0	0	0
286	47	3	0	0	0	0	0	3	1	1	0	3	0	0	0
287	10	1	0	0	0	0	0	2	3	0	0	1	0	1	0
288	17	2	0	0	0	0	0	1	1	0	0	1	3	0	0
289	17	1	0	0	5	0	0	0	0	0	0	0	0	0	0
290	2	2	0	0	0	0	0	0	0	0	0	0	1	0	0
291	35	6	0	0	7	0	0	1	0	0	0	2	0	0	0
292	7	4	0	0	1	1	0	0	0	0	0	0	0	0	0
293	29	7	0	0	9	2	0	0	0	0	0	1	0	0	0
294	6	0	0	0	1	0	0	1	0	0	0	0	0	0	0
295	96	11	2	0	15	0	0	7	0	2	0	3	2	1	0
297	31	1	0	0	4	1	0	2	0	4	0	4	0	0	0
298	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0
299	82	5	0	0	4	1	0	2	1	0	0	3	2	0	0
300	60	3	0	0	1	0	0	3	0	0	0	2	0	0	0
301	31	2	0	0	0	0	0	3	5	9	0	5	0	0	0
302	4	3	0	0	0	0	0	3	1	0	0	0	0	0	0
303	12	1	0	0	0	0	0	0	0	0	0	0	0	0	0
304	130	13	1	0	3	4	0	6	1	4	1	3	1	0	64
305	12	5	0	0	1	0	0	1	0	0	0	2	3	0	0
306	5	4	0	0	0	0	0	2	0	0	0	0	0	0	0
307	7	6	0	0	0	0	0	1	0	0	0	2	0	1	0
308	16	17	0	0	0	0	1	2	4	0	1	11	2	0	0
309	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0
311	25	5	0	0	1	0	0	1	0	0	0	3	1	0	0
312	38	6	1	0	0	0	1	4	2	0	0	3	1	0	0
313	1	0	1	0	0	0	0	1	0	0	0	0	1	0	0
314	17	4	0	0	0	0	0	1	0	0	0	1	1	0	0
315	7	5	0	0	2	0	0	0	0	0	0	2	2	0	0
316	8	1	1	0	0	0	0	2	3	0	0	2	2	0	0
317	25	3	0	0	0	0	0	1	2	1	0	3	1	0	0
318	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
319	42	2	0	0	1	1	0	0	0	1	0	1	1	0	0
320	44	28	2	0	16	1	2	8	3	7	1	6	0	0	0
321	10	3	0	0	1	0	0	1	0	0	0	3	0	0	0
322	1	4	0	0	0	1	0	2	1	0	0	1	2	0	0
324	11	1	0	0	1	0	0	0	0	0	0	0	0	0	0
325	21	2	0	0	0	1	0	1	0	0	0	0	0	0	0
326	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
327	9	0	0	0	1	0	0	2	0	0	0	1	0	0	0
328	52	0	0	0	0	0	0	0	0	0	0	1	0	0	0
329	1	0	0	0	0	1	0	1	0	0	0	1	0	0	0
330	39	0	0	0	0	0	0	0	0	0	0	1	0	1	0
Totals:	5,251	571	47	3	171	63	17	276	74	81	7	229	80	11	79

GRAND TOTAL = 6,960 Cultural Items

use-wear.

Utilized/Retouched Flakes

A total of 571 flakes were recorded which exhibit edge damage of surface modifications indicative of utilization. These artifacts were tabulated as utilized and/or retouched flakes. Generally speaking, if four or more flake scars existed on the edge of a given flake, it was considered to have been the result of utilization in a cultural context rather than the result of natural processes. This is a purely arbitrary distinction for minimum use-wear attributes and it is not known how effective it was. Certainly the morphology of the flake scars, their spacing on an artifact edge and raw material type were factors in classifying a flake as utilized. Retouch on flake edges is generally characterized by larger, more evenly spaced flake scars than occur from utilization.

Utilized and retouched flakes may have served a variety of functions related to subsistence activities. Resource procurement and processing in the context of activities such as cutting, scraping, sawing, etc., could be performed with flake tools. Specific activity sets such as cutting tools vs. scraping tools were not distinguished for the site classification because of the limitations mentioned above.

Patterned End and Side Scrapers

Two classes of scraping tools were grouped separately from the

general category of utilized and/or retouched flakes. These are patterned end scrapers and patterned side scrapers. End scrapers are beveled implements made on flakes or blades with the working edge on one or both convex ends. End scrapers wre considered to be patterned if edge retouch resulted in a continuous, even convex edge on at least one end of the artifact. Patterned side scrapers were also identified by continuous edge retouch, but on one or both of the lateral edges of the flake. The point at which a particular artifact ceases to be a retouched flake and becomes a patterned end scraper or other patterned artifact may be difficult to determine in some cases. Although certain utilized and/or retouched flakes and patterned scrapers may have been used in similar tasks related to resource processing, it is currently believed that flake tools were more expendable than patterned scrapers and therefore less likely to be maintained or "curated" for future use. A total of 47 patterned end scrapers and three patterned side scrapers were recovered during the project. These two artifact classes collectively comprise less than 1% of the total artifact inventory.

Cores and Core Tools

Cores are another category of lithic artifacts used in the analysis. A core is defined by Crabtree as a "...mass of material... such as a piece of natural, unprepared, raw material with a scar, or scars reflecting the detachment of one or more flakes" (1972:54-56). A core is the nucleus from which stone artifacts are initiated by flake removal. Tool production activities may then be inferred for sites

which have yielded cores. The 171 cores recorded represent about 2.5% of the artifact inventory.

Some cores also exhibit edge modification which was interpreted as use-wear, indicating that these specimens were used as tools. The 63 cores exhibiting use-wear were classified separately as "core tools." These tools may have been used in a variety of resource procurement and processing tasks. The larger core tools, many of which exhibit crushing along one or more edges, may have been used as chopping tools to break up materials such as bone.

Hammerstones

Hammerstones may also have been used to smash bone or used in other tasks related to resource procurement and processing. It is also possible that they were used in stone tool production to initiate flake removal and to prepare edges for subsequent modification or tool maintenance. Hammerstones are generally made from river cobbles of a size that fit well in one's hand. These tools are frequently sandstones or other sedimentary cobbles rather than siliceous raw materials. Use-wear is most often evident as localized areas of abrasion or crushing. A total of 17 hammerstones were recorded, less than 1% of the total number of cultural items.

Projectile Points

Projectile points were the most frequently occurring class of

patterned stone tools in the entire inventory. A total of 276 projectile points or fragments were recovered, representing about 4% of the total number of cultural items. Projectile points are defined as hafted tools, often bifacially flaked, which were manufactured for the purpose of penetration. They could have been used for other functions, but their primary use was probably as a hafted hunting implement. Distal hinge fracturing, impact fractures and use-wear restricted to extreme distal edge margins may also indicate use as a projectile (cf. Zier 1978). Points could have been used to kill either animals or humans, but it is assumed that they were generally used in hunting animals.

Manos

Manos are handheld grinding implements generally manufactured from sedimentary raw material. They are often pecked to a specific shape and are believed to have functioned in food processing activities. The 74 manos recovered during the project comprise about 1.1% of the artifact inventory.

Metates

Metates are stationary grinding slabs usually manufactured from hard, fine-grained sandstone (cf. Frison 1978:352-353). They are believed to have been used in conjunction with manos to process foods by grinding. Metates were generally pecked to a shape producing a central

depression which could catch and hold whatever was being ground, such as seeds. A total of 81 metates or fragments were collected, about 1.2% of the artifact inventory.

Miscellaneous Ground Stone

Seven artifacts have been tabulated as miscellaneous ground stone tools. These were either too fragmentary to indicate a specific classification or may have served more than one undetermined function. They represent considerably less than 1% of the artifact inventory.

Non-utilized Bifaces

Non-utilized bifaces are second only to projectile points in artifact frequency for patterned, stone tool artifact classes. Two hundred and twenty-nine of these artifacts were identified during the analysis, about 3.3% of the total. Bifaces are defined as artifacts bearing flake scars on both surfaces (Crabtree 1972:38). A biface was classified as non-utilized if no evidence of use-wear was indicated under magnification. Many of the non-utilized bifaces may be blanks or preforms and thus represent an early stage in tool production. Others may simply be cores which have had flakes removed from two surfaces.

Utilized Bifaces

Utilization was found on 80 bifaces, about 1.2% of the total number

of artifacts. A variety of tasks related to resource procurement and processing could have been carried out using these tools (cf. Ahler 1970, Zier 1978). Interpreting the derivation of small flake scars on the edges of bifacial tools must be approached with extreme caution (Zier 1978). For example, flake scars may remain from previous stages of tool manufacture (Sheets 1973) and may not be related to use-wear. In addition, retouch generally increases the edge angle compared to previously unmodified flake edges, making it less likely for pronounced use-wear microflaking to occur when the edge is placed under stress. The possibility that some of these tools have been misidentified as utilized cannot be ignored because of these limitations. However, most of these artifacts probably represent completed tools used in different tasks, rather than preforms or blanks.

Gravers

The final category of lithic artifacts is that of gravers. Crabtree defines a graver as "a stone implement generally made by pressure flaking and intentionally designed to have a functional point or points. It is generally assumed that gravers are used to incise or form organic materials and soft stone" (1972:68). Eleven gravers were recorded during the project, less than 1% of the total artifact inventory.

Ceramics

Ceramic artifacts are represented by 79 sherds from at least 4 different vessels. These are described more fully in the following discussion. Ceramic vessels can be used in a variety of ways. Among hunters and gatherers, however, it seems likely that ceramic vessels would have been used in ways that excluded the use of other, more convenient containers for nomadic groups, such as baskets. Storage of foods such as seeds, and certain cooking techniques other than stone boiling are two possibilities. In the case of food storage, ceramic containers might provide better protection against rodents than other methods of storage.

CHRONOLOGICAL ANALYSIS OF ARTIFACTS

Thomas (1974) discusses several kinds of artifact types based on artifact morphology and urges all researchers to be specific in describing precisely which kind of type is being discussed in a given situation. His concept of a temporal type is used in this study to develop a site chronology. Thomas defines a temporal type as "a set of one or more morphological types with a fixed and known range in time" (1974:10). Typology, based on temporal types, should describe quantifiable changes in cultural material through time (Frison 1978). These types should allow both intrasite and intersite dating of assemblages. Temporal types are used in a manner similar to the geological use of index fossils which provide a relative date for

materials within the same deposit (Thomas 1974, Frison 1978).

Artifact types must not be equated with particular cultures, but treated as arbitrary constructs that organize data into describable categories. Binford (1965), in particular, has criticized the implied cultural significance typologists sometimes impose on their types.

The vast majority of artifacts recovered in North Park and adjacent areas consist of stone tools and debitage. For this reason it seems appropriate to look toward lithic analysis for temporal types. Frison states that, for the Northwestern Plains, about "the only things that change through time were projectile point types and styles, and to a lesser extent certain items in tool assemblages" (1978:19). Since projectile points are frequently encountered on the Plains, they are perhaps the only temporal indicator in situations such as this study where absolute or other relative dating techniques cannot currently be applied.

Less frequently occurring items may be considered as possible temporal indicators (Frison 1978). Among these are grooved cobbles, stylized stone knives and fired ceramics for the Late Prehistoric period. Particular tools such as Cody knives and pointed flake tools (gravers) may indicate site utilization during the Paleoindian period.

Projectile point assemblages from a given time period or site component seldom, if ever, exhibit uniform morphological attributes. It is more likely that there will be a considerable range of variation in each attribute analyzed, even though all the artifacts are grouped into the same functional category. Absolute dated assemblages indicate that a considerable range of variation may be expected for projectile points

within any given time period.

Frison, Wilson and Wilson (1974) have proposed the term technofacies to incorporate the archaeological concepts of component and assemblage into one term. Technofacies represent groups of temporal types with a bounded distribution in space and time. A technofacies actually represents archaeological units which may include several temporal types. In cases where an artifact assemblage is deposited in a single _in situ_ site component, a technofacies would include _all_ artifacts regardless of whether or not they are temporally diagnostic as individual items.

Surface archaeological manifestations pose a separate problem, because contemporaneity of all items is not as easily demonstrated. When the term "site component" is used below, it is on the basis of a particular assumption: if an artifact found on a given site surface can be recognized as a temporal type, that site is assumed to have been occupied during the time period represented by that type. In this context it is the site component that is being dated by the presence of a temporal type. When several temporally diagnostic artifacts representative of more than one time period are present on a single site, that site is assumed to be multicomponent, and it may or may not have buried, cultural stratigraphy.

The use of the technofacies concept in this study applies to the dating of a discrete occupational event at a site based on the presence of one or more temporal types of projectile points or other artifacts. Associated artifacts and nonartifact materials on the site cannot be similarly dated due to the surface nature of the evidence.

Projectile Points

Given the present state of archaeology in North Park it has been necessary to compare projectile points to existing temporal types elsewhere, which have been established using absolute dating. This form of cross-dating (cf. Hester, et al. 1975) is considered the best possible means to currently estimate time depth for prehistoric occupation in the Park.

North Park's geographical position is such that is it located peripheral to several cultural areas and archaeological subareas. The Plains lie to the east, the Great Basin to the west and the Plateau region to the northwest. The Park lies in the Rocky Mountain chain which is the traditional boundary of the Plains culture area. This presents added difficulty in relating the sequence of prehistoric occupation in the Park to a specific culture area, the context in which regional chronologies are generally constructed. Jennings (1974:269) and Frison (1978:2-5) include the North Park region in the Northwestern Plains portion of the Great Plains.

The Northwestern Plains conveniently offers perhaps the most up-to-date chronology (Mulloy 1958; Frison et al 1974; Frison 1976, 1978). Hundreds of radiocarbon dates have been published for site components which include diagnostic projectile point types in their assemblages, and technofacies have already been constructed which illustrate change in projectile point styles through time (Frison et al. 1974).

Areas other than the Northwestern Plains have been considered as potential contributors to the regional prehistoric picture in North

Park. Hester's (1973) recent work with the Great Basin chronology provides a synthesis of that area's prehistory, which has been consulted for the structuring of the North Park chronology. Unfortunately, Hester does not include artifact illustrations, making it difficult to compare projectile point assemblages unless the primary references he cites are consulted. References from the Colorado Plateau (eg. Wormington and Lister 1956, Buckles 1971) and the Western Plains and Rocky Mountain foothills (eg., Wood 1967, Breternitz 1971, Irwin and Irwin 1959, Irwin-Williams and Irwin 1966) have also been reviewed for comparative data.

A chronological model based on the current Northwestern Plains sequence (Frison 1978) is employed in this study, but as our data base increases through continuing investigations we must be prepared to modify or even discard the present chronology. Not every projectile point from North Park fits into the chronology for the Northwestern Plains with equal ease. Even so, it seems the most applicable, currently available scheme.

Five time periods are recognized in the Northwestern Plains, each of which includes recognizable projectile point styles. These periods, taken from Frison (1978:83), are: (1) Paleoindian 9500-5500 B.C. (ca. 11,500-7500 B.P.); (2) Early Plains Archaic 6000-3000 B.C. (ca. 8000-5000 B.P.); (3) Middle Plains Archaic 3000-500 B.C. (ca. 5000-2500 B.P.); (4) Late Plains Archaic 1000 B.C.-A.D. 500 (ca. 3000-1500 B.P.); and (5) Late Prehistoric A.D. 1-1800 or historic contact (ca. 2000-200 B.P.). Other researchers have used different terminology (eg. Mulloy 1958) for the chronology but the current terminology is preferred here.

Considerable overlap in time span exists between most periods but this is to be expected if standard deviations of radiocarbon dates are taken into consideration. Certain projectile point styles may also persist longer than others.

Site components which are dated to these periods are considered broadly contemporary if they are dated to the same period. In this context, Paleoindian sites can be compared to other settlements during later periods to investigate changes in settlement patterns. Other periods can be similarly treated. True contemporaneity, without more adequate dating resolution, cannot be determined. Griffin (1978:xvii) has recently cautioned researchers abut the problem of contemporaneity in settlement pattern studies, but such research cannot proceed without some basic assumptions about the temporal context of occupation.

A total of 276 projectile points and point fragments were collected from the recorded sites. One hundred and eighty-seven of these (67.8 percent) have been assigned to a particular time period using comparative data from literature. Any other investigator may organize these data differently.

Since the areas surveyed represent a nonrandom sample of North Park, the chronological considerations presented here involve only the sites found within the survey boundaries. A total of 151 prehistoric sites or sites with prehistoric components were found within the survey boundaries. Components from 86 of these sites are believed to be datable by projectile point styles and one site is dated by the presence of ceramics although no projectile points were found. These 87 sites represent 57.8 percent of the total number of sites recorded within the

survey boundaries. A total of 61 sites (69.2 percent) are single component and 26 (29.6) percent are multicomponent. Temporal assignments of the dated prehistoric sites are listed in Appendix F and by component in Appendix G.

No fluted projectile points were recovered during the survey but 17 projectile points and fragments may be of late Paleoindian age. These artifacts represent 12 site components (9.4 percent of the total). A total of 15 projectile points and fragments are believed to be of Early Plains Archaic affiliation. These represent 13 site components (10.2 percent of the total). Thirty-three projectile pionts diagnostic of the Middle Plains Archaic period were recovered from site surfaces within the survey boundaries yielding 23 site components (18.0 percent of the total). The Late Plains Archaic is believed to be represented by 61 projectile points and fragments for a total of 41 site components (32.0 percent of the total). Sixty-one projectile points and fragments plus one ceramic assemblage at a site which produced no projectile points delineate 39 Late Prehistoric site components (30.5 percent of the total).

These data give a general indication of the distribution of prehistoric occupation within the survey area based on the application of projectile point typology as a chronological tool. Assemblages analyzed in a study such as this seldom include only ideal types and more often include artifacts which grade into each other as numerous morphological attributes are compared. For this reason a brief description of projectile points representative of each time period in North Park is given below.

Paleoindian Period

Four projectile point fragments recovered from 5JA245 are believed to be of Paleoindian age. These specimens exhibit both collateral and parallel oblique flaking and all have lateral and basal edge grinding. Three of these points are illustrated below (Figure 6). These artifacts are all variations of a lanceolate form but there are notable differences between them.

One projectile point (Figure 6b) is collaterally flaked and has a blade element that expands in width distally from the base. No shoulder is evident. Similar points are illustrted by Wheat (1972:128-9) from the Olsen-Chubbuck site dated at 8200 B.C. ±500 years (10,150 ±500 B.P.; A-744; Wheat 1972:156) and are referred to as Firstview points. Similarities also exist with artifacts of the widespread Cody Complex which is found from the Plains into intermontane basins up to timberline (Frison 1978:34). The Cody Complex generally post-dates Firstview artifacts (Wheat 1972) and the similarities and differences between the two are not yet completely understood. Two other point bases suggest Cody Complex basal morphology. One is from 5JA177 and one is from 5JA192.

One collaterally flaked lanceolate base from 5JA245 (Figure 6) has a relatively flat basal edge which flares out from the ground, lateral portion of the base. This forms a projection at the intersection of each lateral edge with the basal edge. This point and a basal fragment of a similar point from 5JA245 are somewhat anomalous but share several attribute with the other Paleoindian forms (eg., basal grinding,

Figure 6. Paleoindian projectile points from 5JA245.
a, 5JA245-3; b, 5JA245-29; c, 5JA245-17.

lanceolate morphology and collateral flaking). A nearly complete projectile point from 5JA240 also is collaterally flaked and exhibits slight projections at the intersections of the lateral and basal edge (Figure 7). There is no basal grinding on this specimen.

A parallel, oblique flaked lanceolate base from 5JA245 (Figure 6) exhibits lateral constrictions on the base similar to a point from Cultural Layer 35 at Mummy Cave (Husted 1978:132) which has estimated dates of ca. 7000-7500 B.C. Husted (1978) recognizes similarities with Lovell Constricted points from Bighorn Canyon (Husted 1969).

Several other basally ground, lanceolate projectile points were found during the survey (eg., Figure 7, c, d). Parallel oblique flaking or parallel transverse flaking is characteristic of most of these. Similar forms have been found in numerous locations in intermontane basins and other ares in the Rocky Mountains (eg., Husted 1969). Frison and Wilson (1975) and Frison (1976, 1978) mention analogous artifacts at Medicine Lodge Creek dated at 6000-6500 B.C. (ca. 8000-8500 B.P.). Husted (1978:128) illustrates lanceolate forms from Cultural Layers 27-31 at Mummy Cave which have been dated between ca. 6150-7000 B.C. Occupation 1 at Pine Springs in southwestern Wyoming also yielded similar forms (Sharrock 1966:53).

One projectile point from 5JA295 in North Park has moderately ground lateral edges on the base and well defined shoulders (Figure 7). A graver was also recovered from the surface of this site. Gravers are pointed flake tools and such artifacts are considered as chronological indicators for Paleoindian occupation, but are somewhat less reliable than projectile points (Frison 1978:77).

Figure 7. Paleoindian projectile points recovered during the North Park Project. a, 5JA320-68; b, 5JA169-1; c, 5JA254-4; d, 5JA238-1; e, 5JA240-1; f, 5JA288-1; g, 5JA295-38; h, 5JA273-7.

Most of the Paleoindian projectile points resemble the mountain-oriented Paleoindian complexes more than the classic Plains complexes such as at Hell Gap (Irwin-Williams et al. 1973). There are a considerable number of unanswered questions relating to the so-called mountain-oriented Paleoindian groups (see Frison 1978:21) that undoubtedly affect the accuracy of any artifact classification. In addition, events such as tool resharpening, and conditions such as raw material type, can contribute to the internal variability of projectile point morphology within a time period or within a particular projectile point type. These problems cannot be resolved here and refinement of this current classification awaits more detailed investigation of these sites.

Early Plains Archaic

Projectile point types of the Early Plains Archaic illustrate an abrupt change to laterally notched basal forms in contrast to the earlier Paleoindian lanceolates (Frison 1978). This time period is essentially coincident with the Altithermal (Antevs 1955). Sequences for these point types have been established at sites such as Mummy Cave in northwestern Wyoming (Wedel at al. 1968, Husted 1978) and Laddie Creek in the Bighorn Mountains of north central Wyoming (Frison 1978).

A recent monograph documents the presence of the Mount Albion Complex in the Southern Rockies with dates between ca. 5500-3000 B.C. (7500-5000 B.P.) (Benedict and Olson 1978). The range of variation in projectile points from this complex include forms similar to some

artifacts recovered in North Park. These points are described by Benedict and Olson (1978) as being broadly corner-notched with basally ground, straight to strongly convex bases (eg., Benedict and Olson 1978:49). The Magic Mountain Complex at the Magic Mountain site (Irwin-Williams and Irwin 1966) has yielded similar forms but without the pronounced basal grinding. Wilbur Thomas Shelter (Breternitz 1971) also produced similar forms. A number of projectile point bases recovered during the survey (Figure 8, c, e) suggest strong similarities to both the Mount Albion and Magic Mountain Complexes.

Proposed Early Plains Archaic projectile points from North Park include at least two bases (Figure 8, a, b) that are similar to points recovered at Hawken in the Wyoming portion of the Black Hills (Frison et al. 1976). This site is dated at 4520 B.C. ±140 years (6470 ±140 B.P., RL-185); and 4320 B.C. ±170 years (6270 ±170 B.P., RL-437) (Frison et al. 1976). Similar points were found at the Helen Lookingbill site in the Owl Creek Mountain of Wyoming dated at 5190 B.C. ±160 years (7140 ±160 B.P., RL-554, Frison 1978:41). Large side-notched projectile points were also recovered at Danger Cave in the Great Basin in what appears to be a fairly early context (Jennings 1957).

Frison (1978) notes that a wide range of projectile point styles including both side and corner-notched forms characterize the end of this period. The shift in projectile point styles from lanceolate to notched forms is not completely understood and some of the variability within the period may be linked to particular technological or subsistence activities. Frison, Wilson and Wilson (1974) suggest that

Figure 8. Early Plains Archaic projectile points recovered during the North Park Project. a, 5JA167-52; b, 5JA161-1; c, 5JA301-15; d, 5JA164-2; e, 5JA166-22.

the shift to notched point forms may represent the result in a shift toward different hafting techniques. This does not imply that the Early Plains Archaic was necessarily a radical shift in the subsistence technology from the earlier Paleoindian period. The "Archaic" term in this sense is used as a period designator and not necessarily as a distinct economic stage in cultural evolution. As Frison points out, "If an Archaic stage concept is applied to the Northwestern Plains, rigid time boundaries will someday have to be discarded" (1978:21-22). However, any occupation in North Park, by virtue of its physiographic location and resource base, may be more adapted to a hunting and gathering "Archaic" stage than to the classic big game hunting which typified the Plains. Frison (1978) suggests this possibility for similar regions in the Northwestern Plains including intermontane basins and foothill zones.

Both the Paleoindian and Early Plains Archaic periods in the foothills and mountain regions peripheral to the Plains present real problems in constructing a chronology for the Northwestern Plains (Frison 1978). North Park is no exception in this situation. Several projectile points identified initially as Late Plains Archaic were reclassified as Early Plains Archaic variants when more of the recent literature was consulted. This does not mean that these artifacts are definitely Early Plains Archaic in age but it does serve to illustrate the dilemma Frison mentions. Further investigations in intermontane basins such as North Park are needed before these problems may be resolved.

Middle Plains Archaic

One projectile point from 5JA195 (Figure 9) resembles the Oxbow type (Nero and McCorquodale 1958) which dates from the terminal Early Plains Archaic to initial Middle Plains Archaic (Frison 1978). Similarities also exist between this artifact and projectile points of the McKean Complex from the Dead Indian site in northern Wyoming (Frison 1978:43), Figure 8, f, g). The McKean Complex generally post-dates the Oxbow Complex on the Northwestern Plains and it involves a wide range of projectile point forms (see Frison et al. 1974, Frison 1978, Syms 1969). Wheeler (1952, 1954) and Mulloy (1954) did pioneering work with the Complex, and both recognized a considerable variation of point morphology during this period. Mulloy (1954) lumped the different variants into a range of variation of a single point type and Wheeler (1952, 1954) named a different type for each variant. The range of variation in points during this time period include lanceolate forms with concave bases, a variety of parallel to expanding stemmed forms, side-notched forms and corner-notched or broadly expanding stemmed forms with concave bases.

Several side-notched points, often with notched bases, which were recovered from North Park resemble the Mallory points recovered elsewhere on the Northwestern Plains dating to this period (Figure 10) (eg., Lobdell 1973, Sharrock 1966). The Scoggin site, located on the North Platte River in south central Wyoming, contains Mallory side-notched points in association with McKean Lanceolate points in a bison kill context dated at 2590 B.C. ±110 years (4540 ±110

B.P., RL-174, Lobdell 1973). Similar projectile point forms were recovered from the Albion Boardinghouse site in north central Colorado (Benedict 1975b) although the association of the points to a date of 470 B.C. ±220 years (2420 ±220 B.P., I-4582, Benedict 1975b) is questionable. Sharrock (1966) illustrates side-notched points from Occupation 2 at Pine Springs which are also similar to those recovered in North Park. Lobdell (1974) summarizes this point style and its general distribution on the Northwestern Plains and adjacent areas and concludes that it is a variation of the McKean Complex.

Stemmed point forms are considerably variable in overall morphology, and several were recovered from North Park that are indicative of this period. Some of these are illustrated in Figure 9. Similar forms have a wide geographical distribution during this general time period (eg., Jennings 1975, Hester 1973, Fitting 1964).

McKean Lanceolate projectile points also vary considerably with respect to several attributes. Lobdell (1973) illustrates several of these artifacts. Frison (1978:54) illustrates projectile points of the McKean Complex from the Dead Indian site in the Absaroka Mountains in northern Wyoming and variations in both lanceolate and stemmed forms can be seen. Radiocarbon dates for the Dead Indian site range from 1850 B.C. ±110 years (3800 ±110 B.P., RL-321) to 2480 B.C. ±250 years (4430 ±250 B.P., W-2599) (Frison 1978:47).

Both parallel oblique and collateral expanding flaking patterns have been recognized on McKean Lanceolates from Scoggin (Miller 1976). This suggests that variation in McKean projectile points can be recognized in attributes relating to the sequence of production as well

Figure 9. Middle Plains Archaic stemmed projectile points recovered during the North Park Project. a, 5JA253-1; b, 5JA305-2; c, 5JA195-6; d, 5JA273-11.

Figure 10. Middle Plains Archaic notched projectile points recovered during the North Park Project. a, 5JA151-6; b, 5JA47-16; c, 5JA204-13.

as those related to the overall morphology of the finished artifacts.

A number of contracting-stemmed projectile points with rounded basal edges (Figure 11) were recovered from North Park. A similar style could not be located from the Northwestern Plains data. Frison (1978:30, Fig. 2.2d) illustrates what appears to be a larger variant of the general form but he suggests a date of about 7670 B.C. ±260 years (9620 ±260 B.P., RL-153, Frison 1978:24) which would place it well into the Paleoindian period. A more likely comparative sample for the North Park specimens, with regard to overall morphology may be Irwin-Williams' (1973) En Medio Complex from northwestern New Mexico. She believes this Complex lasted from about 800 B.C. to A.D. 400. Whether or not there is actually any relationship between the North Park assemblage and the En Medio Complex remains to be determined. Other sites in the Southern Rocky Mountains have produced similar artifacts. John Gooding (personal communication 1978) mentions the presence of similar points recovered from the Vail Pass site in Colorado. This particular style represents one of the least known categories in the present classification. Probably not until this point type is found in a datable context in the region will the picture become more clear.

Late Plains Archaic

It is during the Late Plains Archaic that corner-notched projectile point forms predominate to the near exclusion of the previous stemmed and lanceolate varieties. Dry cave sites have produced these large corner-notched points still hafted onto what are interpreted as atlatl

Figure 11. Middle Plains Archaic contracting stemmed projectile points recovered during the North Park Project. a, 5JA166-12; b, 5JA301-16; c, 5JA238-14; d, 5JA166-19; e, 5JA239-1; f, 5JA171-4; g, 5JA273-4; h, 5JA167-43.

dart foreshafts (eg., Frison 1965). These points are often, but not exclusively, ground on the basal edges. Figure 12 illustrates examples of what are believed to be Late Plains Archaic projectile points from North Park.

A fairly distinct, generally side-notched form with a heavily ground base and basal thinning is known from this time period (Frison 1978:222). These are referred to as Besant points (Wettlaufer 1955) and are believed to have cultural affiliations to the north and east of the Northwestern Plains. Points reminiscent of Besant are either absent from the North Park collection or have been misidentified as being representative of another time period. Similarities between Besant point bases and some of those illustrated elsewhere for the Early Plains Archaic may have biased the temporal assignment of some North Park specimens.

Another problem is that some of the smaller corner-notched forms with unground bases may actually be more recent than the Late Plains Archaic. Unground, corner-notched forms are not unknown for the Late Prehistoric period discussed below. Occupation of North Park during the Late Plains Archaic period is perhaps the most difficult to establish based on projectile point typology alone, because of these problems in classification. Once again, controlled excavations may be the best way to resolve any discrepancies.

Late Prehistoric Period

The Late Prehistoric period is generally believed to have begun by

Figure 12. Late Plains Archaic projectile points recovered during the North Park Project. a, 5JA165-1; b, 5JA295-7; c, 5JA312-18; d, 5JA237-1; e, 5JA187-1; f, 5JA300-8; g, 5JA301-17; h, 5JA304-7; i, 5JA191-10.

A.D 500. Projectile points witness a reduction in overall size, probably as a result of the introduction of the bow and arrow (Mulloy 1958, Frison 1978). Fired ceramics also represent a Late Prehistoric technological advancement and can be used as a chronological marker. The earliest pottery on the Northwestern Plains is believed to be of Woodland affiliation and some sites exhibiting such wares predate A.D. 500 (Breternitz 1979). If ceramics are taken as a hallmark of the Late Prehistoric period (Mulloy 1958) the temporal span must be extended to about the beginning of the Christian era.

Projectile point forms are many and varied during this period. Corner-notched varieties somewhat reminiscent of the Late Plains Archaic period occur and are often only smaller in size than their antecedents. Side-notched points vary considerably and several types have been described in the literature (eg., Kehoe 1973). A late occurrence during this period is the side-notched, base-notched forms which lasted into protohistoric times. Frison (1978) summarizes these various projectile point forms. Examples of Late Prehistoric projectile points from the North Park survey are illustrated below (Figure 13). The most frequently occurring, temporally diagnostic projectile points recovered within the survey boundaries are from this time period.

In only one instance could a site be cross-dated without the aid of projectile point typology. This site, 5JA262, produced several sherds of a coarsely tempered, plain, grey ware and projectile points were absent. This site was attributed to the Late Prehistoric period by virtue of the presence of this pottery. Two other sites yielded ceramics (5JA158, 5JA304) but these sites also produced Late Prehistoric

projectile points. These three sites will be discussed below.

Other Points and Fragments

The remaining projectile points and fragments were either classified as unknown Archaic forms or were not classified at all due to lack of sufficiently comparable attributes. Several of these artifacts shared certain attributes with Archaic forms in that they were large, probably too large for a bow and arrow. Most of the artifacts designated as unknown Archaic forms were specimens which could not be confidently assigned to a particular Archaic period, and therefore were excluded from the rest of the anlaysis.

Ceramics

Three sites, 5JA158, 5JA262, and 5JA304, produced prehistoric ceramics. One sherd was recovered from the surface of 5JA158, 14 surface sherds were taken from 5JA262, and 64 sherds were recovered from the surface of 5JA304. In addition to the surface collections at 5JA262, 46 sherds were recovered from test excavations bringing that site's total to 60 sherds.

Attributes generally considered important in describing ceramics and that are used to identify diagnostic types include: (1) method of manufacture; (2) methods of firing; (3) interior, core, and exterior coloration; (4) paste; (5) temper; (6) hardness; (7) characteristic fracture; (8) surface treatment (exterior and interior); (9) thickness;

Figure 13. Late Prehistoric projectile points recovered during the North Park Project. a, 5JA329-1; b, 5JA170-3; c, 5JA191-1; d, 5JA204-4; e, 5JA187-3; f, 5JA307-9; g, 5JA320-66; h, 5JA191-7; i, 5JA191-5; j, 5JA177-41; k, 5JA327-2; l, 5JA295-40.

(10) rim chracteristics; and (11) vessel form (Irwin-Williams and Irwin 1966). With the fragmentary nature of the North Park specimens the final category could not be identified.

5JA158

The single sherd recovered from this site is extremely weathered and is probably from the vessel body. The maximum dimension of the sherd is only 9.2 mm. Cord impressions are visible on the exterior of the sherd suggesting that a cord-wrapped paddle was used. No interior surface treatment could be positively detected. The exterior markings and lack of visible coil junctures suggest a paddle and anvil method of manufacture. Maximum sherd thickness is about 5.9 mm. Tempering is a coarse, quartz sand grit and the sherd exhibits a coarse, friable paste. Quartz particles as large as 1.7 mm. in maximum dimension are exposed on the interior and exterior surfaces of the sherd. Firing was probably in a reducing atmosphere which produced the buff coloration. Hardness is approximately 3.5 on Moh's scale.

Similarities exist between this sherd and ceramics identified as Woodland elsewhere on the Plains (eg., Wood 1967, Irwin-Williams and Irwin 1966). If this affiliation is indeed the case, site 5JA158 may have been occupied at some time during the first millenium A.D. Breternitz (1969) offers several Woodland dates to support this chronological placement.

5JA304

Sixty-two of the sherds from this site appear to be body sherds from a single vessel and one appears to be a rim sherd of the same vessel. None of these are larger than 26.0 mm. in maximum dimension. Exterior surface treatment on these sherds is similar to that from 5JA158 in that cord impressions, presumably from a paddle and anvil manufacturing technique, occur on most of the unweathered sherds. Occasional undulations and striations on the interior of some sherds suggest an anvil stone or some other tool may have been used. Cord impressions extend up to the rim on the rim sherd. The profile illustrates a flat to slightly round rim which has been somewhat smoothed. Both interior and exterior vessel walls project straight down from the rim.

Sherd thickness varies from 3.0 mm. at the rim to a maximum of 9.7 mm. on one of the body sherds. The temper is a quartz sand, of a somewhat finer texture than that used in the sherd at 5JA158. Paste is coarse and friable. Coloration varies from a grey through buff to black, presumably due to unequal exposure to oxygen in the atmosphere during firing. Several sherds appear to have been burned more than others, suggesting prolonged exposure to heat subsequent to initial breakage of the vessel. Others exhibit what may be areas that exploded during the heating process. Some sherds have what seems to be a caliche layer which probably collected subsequent to breakage. Hardness is similar to the sherd at 5JA158.

These ceramics also suggest a Woodland affilation. The rim sherd

is similar to those illustrated by Irwin-Williams and Irwin (1966:164) except that the North Park rim sherd is apparently thinner. No reconstruction of vessel shape was attempted due to the fragmentary nature of the specimens.

One other ceramic sherd (measuring 27.7 mm. in maximum dimension) was collected from the backdirt of a rodent burrow below the ridge where the cord impressed sherds were found. This sherd lacks cord-markings and is probably from a separate vessel. Tempering is coarse, sand grit with extremely large quartz inclusions (up to 5.9 mm. in maximum dimension). Paste is coarse and friable. Undulations and occasional striations are evident on the interior surface of the sherd suggesting possible use of an anvil stone during manufacture. Coloration is a dark buff to almost black. Sherd thickness ranges from 9.2 mm.-11.5 mm. Hardness is about 3.0 on Moh's scale. The only suggestion of surface treatment is minimal exterior surface smoothing and somewhat more pronounced interior smoothing. Firing was probably in a reducing atmosphere. The sherd resembles ceramics identified as intermountain by Mulloy (1958), which are considered to be of possible Shoshonean origin.

5JA262

The 60 plain, grey ware sherds recovered from this site could all conceivably be from the same vessel. All of these appear to be body sherds without a single exception which is a rim sherd. The rim profile ilustrates a slightly rounded, exterior lip and flat, smoothed rim. Several body sherds appear to have been polished on the exterior

surface. Sherds are generally extremely weathered and too small to definitely recognize any interior surface treatment. None are larger than 20.5 mm. in maximum dimension and most are less than half that size. Sherd thickness varies from 5.3 mm. on the rim sherd to over 7.0 mm. on some body sherds. Hardness is about 3.0 on Moh's scale. Tempering is extremely coarse, quartz sand with some quartz pebbles measuring as much as 3.7 mm. in maximum dimension.

Lichens have grown on several sherd surfaces including the broken edges of some, attesting to the fact that the vessel had been broken for some time. Only a small percentage of the vessel is represented by these sherds so no estimate of vessel form was attempted.

Ceramics at 5JA262 also somewhat resemble what has been described as intermountain pottery on the Northwestern Plains (Mulloy 1958). Intermountain wares are believed to be representative of Shoshonean occupation (Mulloy 1958, Frison 1971) and are found widely throughout the mountain areas peripheral to the Northwestern Plains and in intermontane areas such as the Wyoming Basin of southern Wyoming.

Summary

Several possible explanations exist for the uneven distribution of site components through time. One possibility is that some artifacts have been misidentified as particular temporal types. The precision of non-absolute dating techniques has already been discussed and need not be reiterated here.

It is also conceivable that selective surface collecting by non-

professionals has biased the recovery of temporally diagnostic projectile points on site surfaces during this project. Projectile points have traditionally been desired items for surface artifact collectors on the Plains and elsewhere. North Park does not seem to have been an exception. Due to private access and fenced areas this type of collecting may have been more intense in some locations than others. Owl Ridge and Peterson Ridge (above Case Flats) are examples of areas which have certainly been affected by surface collections and even unauthorized excavations at some locations. Ranchers and their families, for instances, have been known to collect prehistoric artifacts from lands where they run cattle or grow hay. In the case of Site 5JA143, our crews were not permitted to make a surface collection of artifacts because the stockman who owns the surface wanted to save the site for his family to collect. This extremely limits our classification of site artifcts because we cannot utilize the benefit of laboratory equipment.

It does seem, however, that there was an unusually high number of diagnostic projectile points recovered during this project, in contrast to Middle Park for example (Lischka and Black 1979). This may suggest that North Park is currently less impacted by artifact collectors.

A third possibility regarding this distribution is that prehistoric cultural factors are responsible. Both the Late Paleoindian and Early Plains Archaic periods illustrate considerably fewer site components than later periods. This suggests a general increase in site component frequency through time. It is possible, but currently not testable, that this distribution also represents an increase in population density

in the survey area through time. It cannot presently be determined whether or not sites within each time period were utilized by the same or different populations. Numerous sites within a particular period may be the result of one or a few highly mobile, pedestrian populations.

USE-WEAR ANALYSIS OF THE LITHICS

An attempt was made to conduct a functional analysis of the chipped stone artifacts by examination of use-wear patterns. Edges of the artifacts were observed using a stereo microscope at low magnification (6x-12x) to determine the presence or absence of edge damage or alteration, and if present, the nature of the alteration. Up to 30 possible different types of edge alteration were coded for the generalized chipped stone categories and the type of activity represented by the edge alteration, such as sawing, scraping, cutting, and drilling, was also coded. The nature of the edge alteration and the type of activity represented was derived from a number of sources, including Keeley (1977, Keller (1966), Odell (1975) and Tringham, et al. (1974).

One problem with the use-wear analysis was the low magnification (6x-12x) used to examine the artifacts. The most distinguishing criterion at this magnification is that of microflaking, which refers to the flake scars produced on tool surfaces as the result of edge attrition during use (cf. Tringham et al. 1974:175). These flake scars are generally more visible under lower magnification than are other use-wear attributes (eg., striations and polish). It is therefore

possible that some flakes which may have been utilized in certain tasks, but did not develop microflaking, escaped detection.

A second limitation is that four researchers were involved in the artifact analysis. Each individual undoubtedly developed his or her own interpretations of what artifact characteristics were or were not related to use-wear. Although each investigator used the same analysis form and the set of definitions of microflaking provided by Tringham et al. (1974), it would be fallacious to believe that no individual bias crept into the analysis. Each researcher had a different amount of experience in lithic analysis, which further confounds the issue. It was hoped, however, that a general level of consistency was maintained throughout the analysis. It is subjectively estimated that all four analysts would agree on the classification of each artifact about 70 percent of the time.

A further limitation is the correlation of a particular type of edge damage on a tool to its own use in a specific task. Frison (1978), for example, warns of the difficulty in analyzing working edges of tools in an effort to recognize task-specific aspects of butchering bison in an experimental context. Butchering imposes such a wide variety of activities upon tools that if a particular tool was used throughout the butchering process, it would be impossible to isolate task-specific activities based on analysis of edge damage. Other subsistence activities requiring the use of stone tools may have had an equally complex range of tasks which could have been performed using the same artifact.

A final consideration is that all of the artifacts analyzed were

surface finds. Edge damage on surface artifacts subsequent to discard is a real possibility (cf. Tringham et al. 1974). Movements of livestock across sites, processes of erosion and human disturbance are a few examples of factors which can result in edge damage.

In light of the adverse circumstances cited above, the results of the use-wear analysis were judged to be somewhat inconclusive and probably contributed to the failure of the factor analysis to extract functional site categories. If the primary adverse factor were to be identified, it is probably the difficulty in identifying use-wear patterns on artifacts exposed on the surface.

VII. The Site Classification

VII. THE SITE CLASSIFICATION

by Mark Miller and Joseph J. Lischka

INTRODUCTION

As noted in Chapter 4, two separate classifications of the prehistoric sites were attempted and the one based on a multivariate analysis of functionally defined artifact categories was unsuccessful. Also, in retrospect, there are other considerations that favor a descriptive classification over a functional one, at least during the initial stages of an analysis. Binford (1978), for example, shows that the artifacts left behind when Eskimo leave hunting stands and game observation sites do not reflect the primary functions of those sites. They derive instead from the other secondary activities carried out at the sites and these secondary activities have no necessary relation to the primary functions of the sites. Also, the kinds of items left behind at the sites versus those taken reflect the relative values of the items to the Eskimo. It may be inferred from Binford's ethnographic exercise that functional analysis of the artifact assemblages in a prehistoric site may not necessarily reveal the primary function of that site. Another problem, previously referred to in Chapter 4, is the likelihood that the surface artifacts from a multicomponent site derive from different occupations of the site.

The principal difference between a descriptive and functional classification lies in the inferences a researcher is willing to make after quantification and analysis of site contents is completed. The

descriptive classification was used throughout the analysis and inferences concerning site functions were made only after establishing associations with other variables such as site setting. Any functional inferences are made with the understanding that this is an initial taxonomy which must be tested through excavation.

The critical factor, regardless of what type of classification is used, is that the criteria for grouping sites be standardized. Association of site types with environmental variables would be meaningless if sites were not classified according to the same criteria. No formal site taxonomy was standardized in the field because the results of the artifact analysis were needed to do this. The following classification is based in part on field observations but was developed subsequent to them.

CRITERIA FOR CLASSIFICATION

Two criteria or attributes were used to classify the sites: (1) the presence and diversity of artifacts on sites and (2) the presence and diversity of cultural features. Site size was initially considered as an attribute but was discarded because size can be a function of group size, multiple occupations or both.

The first distinction in the classification was made between two general types of features. These are: (1) features large enough to be remnants of habitation units or other large structural enclosures and (2) smaller features such as rock piles and fire hearths, referred to as non-structural features. In North Park the structural features are

usually stone circles often measuring over three meters in diameter. One site, 5JA312, contains a V-shaped alignment which is also included in this category. The smaller features are often being eroded away by the time field recording is initiated. Archaeological visibility of their former structure is greatly reduced as a consequence. Although many of these smaller features may have served similar functions prehistorically, different stages of erosion may result in a range of morphologies that limits interpretations. A feature that is recorded as a fire-cracked rock concentration, for example, may be a stone boiling pit at an advanced stage of erosion, the discard stones from a fire hearth or the remains of a sweat bath. A total of 144 prehistoric sites found within the survey boundaries are open sites without structural features. These are described as lithic scatters and represent 95% of the total number of recorded prehistoric sites. Only 7 sites contain what may be interpreted as structural features.

The relative frequency and diversity of artifact classes in site assemblages were used to further classify the sites. All but one prehistoric site (5JA326) within the survey boundaries yielded an artifact assemblage. The owner of the land on which that site is located requested that we not collect artifacts. Site 5JA143 was incompletely collected for the same reason, but enough information was collected to type it. The 15 artifact classes described in Chapter 6 were used to estimate the artifact diversity of each site assemblage. If a site assemblage contained only one or two artifact classes, the assemblage was considered to have limited diversity and was classified as a limited activity site. If there were three or more artifact

classes in the assemblage, the assemblage was considered to have multiple diversity and the site was classified as a multiple activity site. Several sites could not be easily placed in one or the other category. A particular site assemblage, for example, may have contained several artifact classes which were believed to be indicative of the same general set of activities; eg., food processing. Classification was also problematic in cases where an artifact class was represented by only one specimen. In these cases, field notes were consulted so the site recorder's impressions could be used. If questions still remained, a subjective decision was made, based on a consideration of all available information including field notes, collected artifacts, amount of site disturbance, etc.

The descriptive site classification, then, was based on: (1) the presence or absence of structural features, (2) the presence or absence of non-structural features and (3) the distinction between limited activity and multiple activity. The combination of these criteria resulted in eight site types.

RESULTS OF THE SITE CLASSIFICATION

Table 11 shows the distribution of the 151 prehistoric sites over eight different site types. The classification of each individual site is listed in Appendices F and G.

Type 1 sites are open, limited activity, lithic scatters without structural or non-structural features. These sites may be characterized in some classifications as special use sites (cf. Plog and Hill 1971).

TABLE 11

SITE CLASSIFICATION FOR THE NORTH PARK PROJECT

Site Type	Structural Features	Non-structural Features	Artifact Diversity	Number of Sites
1	absent	absent	limited activity	61
2	absent	present	limited activity	22
3	absent	absent	multiple activity	33
4	absent	present	multiple activity	28
5	present	absent	limited activity	1
6	present	present	limited activity	2
7	present	absent	multiple activity	1
8	present	present	multiple activity	3
			Total	151

Sites in the type 2 category are similar to type 1 sites except that non-structural features are present. The presence of small features indicates that more effort was expended in preparing these sites and they may represent short-term camps or locales of more extensive resource processing. Nevertheless, they are still characterized as limited activity sites.

Type 3 sites are open lithic scatters with high artifact diversity. These sites are more difficult to fit into other published classifications (cf. Judge 1973, Plog and Hill 1971, Vita-Finzi and Higgs 1970). Limited activity or special use sites can possibly be ruled out because of the high diversity of artifact assemblages. It is possible that non-structural features are present below the surface on some of these sites, or that they have eroded away.

Type 4 sites are open lithic scatters with non-structural features

and high diversity artifact assemblages. They are similar to sites classified elsewhere as basecamps (cf. Judge 1973, Plog and Hill 1971).

Type 5 sites are those with structural features, no non-structural features and limited artifact inventories. Only one site (5JA318) fits this description. The structural features at the site are stone circles which may be remnants of habitation units, although the limited artifact yield and lack of hearths or other small features prevents positive identification as a campsite. One other site (5JA25), which is outside the survey boundaries and is not included in the analysis, has a large number of stone circles but almost no artifacts on the surface. The site, however, has been pothunted for years and it is likely that the original artifact inventory was much larger. The same may be true of site 5JA318.

Two limited activity, structural feature sites (type 6) have associated smaller features. These may be short-term campsites with habitation structures, although one site (5JA326) yielded no artifacts, which may indicate a non-domestic use.

Only one site (5JA311) had structural features, no non-structural features and high artifact diversity (type 7). The artifact inventory indicates possible domestic use but the absence of hearths or other small features distinguishes it from sites more confidently classified as camps.

Three sites have both structural and non-structural features and high artifact diversity (type 8). The artifact inventory and presence of features may indicate that these are campsites which contained habitation structures. Over 30 circular stone structures were found at

one site (5JA47). Various aspects of the settings of these sites indicate that they may represent winter occupations.

In summary, this site classification represents an attempt to standardize the different types of archaeological manifestation in North Park. The labels assigned to each category are not as important as the fact that each category is relatively distinct from others with respect to artifact diversity and types of features. Other investigators may derive different groupings from the same data. The environmental analysis presented in the next section does indicate that there are significant differences between the site types with respect to selected environmental variables. It may be found in future investigations that some of the site types need to be further subdivided or that others need to be combined.

VIII. Site Settlement Patterns

CHAPTER VIII. SITE SETTLEMENT PATTERNS

By Joseph J. Lischka

F and T tests were run on all of the environmental and artifact variables, first with temporal period as the independent variable and then with site type as the independent variable. The results of the analysis and interpretation of results are presented below, first for temporal variation and then for variation between site types.

In evaluating and interpreting the results, several cautionary points must be kept in mind. First, the areas surveyed during the project are not a representative sample of environmental zones in North Park. Consequently, it is possible that parts of settlement patterns or site categories were missed or are underrepresented. Also, all of the data used in the analysis are derived from survey. Nonprofessional collection of artifacts and other factors can skew the surface distributions and frequencies of artifacts. Point collecting in particular is a problem, though apparently not as much in North Park as in other areas. As a consequence of these potential skewing factors, the interpretations made of the results should not be taken as definitive. At best, they suggest possible trends and are possible departure points for future research.

VARIATION BETWEEN TEMPORAL PERIODS

Of the total of 151 prehistoric sites recorded during the North Park Project, 87 had at least one dated component. Of these, 61 sites

were single component sites: 3 Paleoindian, 3 Early Archaic, 11 Middle Archaic, 20 Late Archaic and 24 Late Prehistoric. The increase in numbers of sites through time may be a function of increasing population density, increasing site specialization, increasing mobility or simply the lower archaeological visibility of earlier sites. Only single component sites were used in the chronological analysis to avoid problems in dealing with multicomponent sites. We can't say, for example, to what period the nondiagnostic artifacts or features on a multicomponent site should be assigned. A possible skewing factor is the possibility that sites identified as single component may possibly be multicomponent, since component identification can be based on the presence or absence of only one diagnostic artifact.

The F tests across time periods show relatively little variation between periods. Variation in variable means between periods was significantly greater than variation within periods for only 8 variables: alkaline slopes, projectile points, manos, metates, cutting tools, utilized flakes, and small game (cf. Table 12). The significance of variation in nonutilized bifaces and big game was between 0.05 and 0.1. The T test results are summarized in Table 13.

There appears to have been relatively little variation in environmental variables through time with relation to site location except for small game. It might be inferred from this that there were no marked changes in subsistence patterns through time, at least with respect to the environmental characteristics used in the analysis. It is tempting to see a relation between the high value of the small game mean for Early Archaic sites and a possible decrease in the availability

TABLE 12

MEAN FREQUENCIES PER SITE OF VARIABLES WITH SIGNIFICANT TEMPORAL VARIATION

Variable	Paleo-indian	Early Archaic	Middle Archaic	Late Archaic	Late Prehis-toric	F-test Signifi-cance
Cutting Tools	2.33	0	.27	.25	.42	.0362
Utilized Flakes	2.33	.33	.18	.35	.42	.0135
Manos	1.33	1.33	.27	.40	.25	.0397
Metates	0	3.00	0	.40	.04	.0000
Alkaline Slopes (hectares)	0	12.88	8.35	1.00	.43	.0399
Points	1.33	2.00	1.64	2.40	1.38	.0204
Small Game	312	365	308	307	338	.0180
Nonutilized Bifaces	3.67	3.00	1.00	1.45	1.12	.0589
Big Game	389	432	578	498	536	.0924

TABLE 13

T TEST RESULTS BETWEEN PERIODS

Variable	Paleo-indian	Early Archaic	Middle Archaic	Late Archaic	Late Prehistoric
Bald Slopes	--				
Salt Flats	--				
Mountain Loam	--				
Mountain Shale				--	
Alkaline Slopes		+			-
Points				++	--
Metates					--
Utilized Bifaces	++				
Hammerstones					--
Slope	--		-		
Overview					+

++ = greater than average, significance less than .05
 + = greater than average, significance between .05 and .1
-- = less than average, significnce less than .05
 - = less than average, significance between 0.5 and .1

of large game during the Altithermal, brought about by the worsening environmental conditions of the Altithermal. Small game values for the three Early Archaic sites, however, ranged widely and the difference between the mean for the Early Archaic sites and the mean for all other dated sites was found to be not significant. Alkaline slope within catchment areas shows a significant tendency to decline through time from a high during the Early Archaic. This suggests increasing avoidance of the range site through time, with the exception of Paleoindian sites, which have no alkaline slope in their catchment areas. It is possible that there is some unidentified resource or characteristic associated with alkaline slopes that either declined through time or was not as important in later periods. The significantly low means of bald slope, salt flats and mountain loam for Paleoindian sites and of mountain shale for Late Archaic sites do not suggest any obvious interpretation.

The variation in means of manos and metates is of considerable interest. The F tests indicate that there is significant variation in these two artifact types through time, while the T tests indicate only that the average number of metates in Late Prehistoric sites is significantly lower than the mean for all other single component sites. The average number of manos per site shows a consistent decrease from early to late periods (cf. Table 12) with the highest means occurring during the Paleoindian and Early Archaic periods. With regard to the three Paleoindian sites, three manos were found at 5JA308, one at 5JA288 and none at 5JA169. With regard to the three Early Archaic sites, three manos were found at 5JA265, one at 5JA286 and none at 5JA297. Metate

frequency variation was less consistent but also shows a tendency to decrease through time (cf. Table 12). No metates were found, however, in either Paleoindian or Middle Archaic sites.

Since only two Paleoindian and two Early Archaic sites contained manos, the high means for these periods do not provide a very reliable basis for interpretation. It is possible that the manos were used during later periods and discarded on the sites. The manos at these sites, however, are relatively amorphous in form and do not have the keeled shapes typical of later periods (cf. Frison 1978:352-354). It is not surprising that grinding stones are present at these early period sites. Frison (1978:352) documents the presence of grinding stones as early as 7500 B.C. at the Medicine Lodge Creek site in Wyoming and at other late Paleoindian sites in the Bighorn Basin area. What is surprising is the decrease in mano frequencies through time. There are several possible explanations for this trend, assuming that the trend actually exists. It is generally assumed that grinding stones were used to process vegetable foods, particularly seeds. It has also been suggested that they may have been used to grind up small animal bones (Frison 1978:355). The decrease in grinding stone frequencies may indicate a decreasing emphasis on food grinding through time and possibly a change in food processing techniques, at least in North Park. Alternatively, changes in the form of grinding stones through time may have increased their efficiency so that fewer grinding stones per capita were needed. Grinding stone shapes, however, were relatively stabilized by the end of the Middle Archaic and had presumably reached a maximum in efficiency by that time. The hypothesis, then, does not explain the

continued decrease in mano frequencies during the late Archaic and Late Prehistoric periods.

Nonutilized bifaces also show a tendency to decrease through time, according to the F test results, but it is difficult to interpret this trend in terms of changes in human activities other than a possible change in artifact manufacturing techniques. The variation in cutting tools, utilized flakes and projectile points is similarly difficult to interpret. The means for projectile points, for example, alternate between high and low values through time. No explanation for this pattern is sugested at this time.

VARIATION BETWEEN SITE TYPES

All 151 prehistoric sites recorded during the North Park Project were included in the analysis of variation between site types. It might be argued that the site frequencies of site types 5 through 8 are too low to provide reliable results. Site types 5 and 7 each have only one site, there are two sites in site type 6 and three in site type 8. The statistical techniques used, however, are designed to take this into account.

The F tests of variation between site types showed significant variation in the means of the following variables: projectile points, manos, metates, utilized bifaces, nonutilized bifaces, choppers, end scrapers, site area, mountain shale, deep clay loam, shrubs edible biomass, site elevation, vertical distance to water, and small game. Significant levels of F tests for the following variables were between

0.05 and 0.1: dry mountain loam/valley bench, scraping tools, grass edible biomass, total edible biomass, and horizontal distance to water. The F test results for all of the variables listed above are given in Table 14 and the T test results are summarized in Table 15.

The relatively large number of artifact variables showing significant variation is expected, since the distinction between limited activity sites (site types 1, 2, 5, 6) and multiple activity sites (site types 3, 4, 7, 8) is based on the number of artifact categories on a site. The means of artifact variables showing significant variation are lowest for site types 1 and 2 and highest for types 3 and 4, which is also expected. Means for site types 5 through 8 are less consistent, being zero in most cases, due to the low number of sites in these categories. The consistent variation in artifact variables is also indicated by the T test results (cf. Table 15). Site types 1 and 2 tend to have significantly low means for artifact variables while site type 4 exhibits significantly high means. What is interesting is that there are no artifact variables with significantly high means for limited activity sites. This may mean that the activities using a special kind of artifact at limited activity sites were also performed at multiple activity sites. It could also mean that most lithic tools were multifunctional and used in a variety of activities. A third possibility is that there is considerable variation among limited activity sites with respect to the kinds of activities engaged in.

The variation in edible biomass variables is probably the most interesting result of the entire analysis. Limited activity sites tend to have lower edible biomass means than miltiple activity sites. This

TABLE 14

MEAN FREQUENCIES PER SITE OF VARIABLES
WITH SIGNIFICANT VARIATION BETWEEN SITE TYPES

Variable	1	2	3	4	5	6	7	8	F-test Significance
Endscrapers	.08	.09	.64	.61	0	0	0	.67	.0184
Choppers	.08	.09	.15	.54	1.00	0	0	0	.0007
Nonutilized Bifaces	.56	.68	2.09	2.75	0	1.00	3.00	2.00	.0001
Utilized Bifaces	.11	.18	.97	1.14	0	1.00	1.00	.33	.0000
Manos	.02	.04	.70	1.11	0	0	0	.67	.0000
Metates	.02	.09	.64	1.96	0	0	0	0	.0000
Points	.90	1.00	2.30	3.46	1.00	0	1.00	6.33	.0000
Dry Clay Loam (hectares)	2.03	3.38	.14	3.95	0	0	0	18.92	.0066
Mountain Shale (hectares)	1.89	2.96	1.06	.80	0	0	26.58	1.41	.0010
Shrubs Edible Biomass (kg.)	253	273	270	316	286	244	165	430	.0014
Site Elevation (meters)	2518	2515	2531	2506	2505	2555	2560	2592	.0062
Vertical Distance to Water (meters)	28.6	37.8	23.7	26.8	19.0	38.5	49.0	87.7	.0087
Site Area (sq. meters)	2630	3591	6950	15446	440	4020	36000	185933	.0000
Small Game	318	290	324	340	320	259	208	229	.0424
Dry Mountain Loam/ Valley Bench (hectares)	17.8	21.7	16.2	13.3	56.8	39.9	18.1	14.1	.0871
Scraping Tools	1.49	0.82	2.24	3.14	0	0	2.00	4.67	.0516
Total Edible Biomass (kg.)	7822	8638	8375	9330	9958	8651	5952	12968	.0558
Grass Edible Biomass (kg.)	7009	7680	7512	8370	8802	7712	5219	11510	.0710
Horizontal Distance to Water (meters)	1579	1527	1548	929	440	1450	3600	1850	.0763

TABLE 15

T TEST RESULTS BETWEEN SITE TYPES

	Structures	No				Yes			
	Activities	Limited		Multiple		Limited		Multiple	
	Features	No	Yes	No	Yes	No	Yes	No	Yes
Variable	Site Type	1	2	3	4	5	6	7	8
DML/VB*						++	+		
Bald Slopes					--				
Salt Flats			--						--
Mountain Shale					-			++	
Deep Clay Loam				--					
Mountain Meadow		--							
Alkaline Slopes				--					
Number of Ranges			++						
Site Elevation					--				++
Hor. Distance to Water					--				
Vert. Distance to Water									++
Overview							+	+	+
Grass Edible Biomass		--							++
Shrubs Edible Biomass		--			++				++
Forbs Edible Biomass		-							++
Total Edible Biomass		--							++
Small Game			--		+				--
Big Game				--			++		++
Projectile Points		--	--		++				
Utilized Points				+					
Manos		--	--		++				
Metates		--	--		++				
Cutting Tools		--						+	
Scraping Tools			--		++				+
Sawing Tools			--						
Utilized Flakes		--	-						
Utilized Bifaces		--	--	++	++				
Nonutilized Bifaces		--	--		++				
Choppers		--			++		+		
Endscrapers		--	--	+	+				
Hammerstones		-							
Site Area		--	--						

*DML/VB = Dry Mountain Loam/Valley Bench
++ = Greater than aveage, significance less than .05
+ = Greater than average, significance between .05 and .1
-- = Less than average, significance less than .05
- = Less than average, significance between .05 and .1

pattern is particularly evident in comparing the T test results for site types 1 and 8. Site type 1, which is comprised of limited activity sites with no features or structures, has significantly low means for grass, shrubs and total edible biomass and a less than significant low mean for forbs edible biomass. Site type 8, which includes multiple activity sites with structures and features, has significantly high means for all four edible biomass variables. Site type 4, which includes multiple activity sites with features but no structures, has a significantly high mean for shrubs edible biomass. Assuming that type 8 sites are relatively permanent base camps, the results show a clear tendency for prehistoric peoples to establish base camps in areas with the highest density of vegetational food resources.

The small game index exhibits significant variation between site types and the highest value is associated with type 4 sites. The T test shows significantly low means for site types 2 and 8 and a high mean for site type 4. This indicates that small game densities are higher than average around site types 2 and 8. Small game has been defined as a high security/low prestige food source and is similar in that sense to wild plant foods.

Although the F test did not show significant variation of the big game index between site types, the T test results show significantly high means for site types 6 and 8 and a significantly low mean for site type 3. A low big game value would be expected for a base camp of hunters and gatherers since they tend to establish base camps far from big game habitats to avoid disturbing the game. A high value might be expected for hunting blind or game drive sites. Winter campsites also

tend to be located close to concentrations of big game.

According to the T test results, type 8 sites occur at higher elevations and tend to have better overview than other sites but also are farther from permanent water sources, at least vertically. This suggests that high edible biomass and good overview were chosen at the expense of easy access to water. There are three type 8 sites: 5JA182, 5JA312 and 5JA47. Site 5JA182 is Middle Archaic, site 5JA312 is Late Archaic and 5JA47 is a multicomponent site with Middle and Late Archaic and Late Prehistoric components. 5JA182 is located on a ridge about 4 km. east of Pole Mtn. overlooking Anderson Draw and Cow Creek, and it has one circular stone structure. 5JA47 is located on Owl Ridge and overlooks the Illinois River to the southwest and Owl Creek to the northeast. There are 30 circular stone structures on the site. The relatively good overview from these sites suggests that the locations were selected for viewing of game movements. The good overview might also relate to the ability to see the movements of other, possibly hostile groups.

The variation of range site means shows no clear patterning. The number of range sites within a catchment area, however, shows a significantly high mean for site type 2.

SITE TYPE FUNCTIONS

The results of the analysis of the variation in artifact and environmental variables between site types, in combination with several external sources of information, provide a basis for examining the

nature of the site types in terms of their place in the prehistoric settlement system of North Park.

Site Type 1

This site type was defined as a limited activity scatter lacking features or architecture. The statistical analysis failed to reveal a positive association between the site type and any of the artifact or environmental variables. It did show that the 1/2 km. catchment circles around these sites contained significantly lower amounts of potential plant foods than the means for all other sites. This indicates that the activities carried out at type 1 sites were either associated with the exploitation of secondary resources or were not food-getting activities at all. Further exploration of site type 1 functions is hampered by the lack of significant positive associations with any of the variables.

Site Type 2

These are limited activity sites with features but no architecture. The features at these sites are usually hearths, which could have been used for cooking, warmth or the processing of whatever resources might have been exploited from these sites. The only variable showing a positive association with this site type is the number of range sites within a catchment area. This variable was designed as a measure of environmental diversity and it only shows a positive association with site type 2. This suggests that the activities at type 2 sites may have

been related to exploitation of a variety of resources, either food or nonfood. What these resources were, however, is not clear.

Site Type 3

Type 3 sites are multiple activity sites lacking features or architecture. When the site classification was formulated, it was felt that these sites may in fact have feaures but they either were not seen by the surveyors or were buried. If features were present, they would be type 4 sites. The statistical analysis shows no clear pattern of associations with the artifact or environmental variables, except for positive association with utilized bifaces, utilized points and side scrapers. There is a clear negative association with the big game index. This last association tentatively suggests a campsite, but the other associations are too vague to support a definite identification of site function.

Site Type 4

The wide range of artifact types and the presence of features on these sites suggest that they were base camps. The density of wild plant foods obtained from shrubs is significantly higher than average in the catchment areas of these sites. The biomasses of edible grasses and forbs also tend to be high but not high enough to be statistically significant. The density of small game around these sites is significantly higher than average at the 0.1 level of significance.

Site elevation and horizontal distance to water are lower than average.

It was proposed that base camps were established in areas with high densities of high security/low prestige resources, such as wild plant foods and small game. While the associations noted above do not constitute a valid test of the proposition, they do suggest that sites of this type do represent base camps. The fact that the edible portions of shrubs generally do not become available until the late summer and fall may indicate that these sites were occupied primarily during those seasons.

Site Type 5

This site type includes limited activity sites with some evidence of architecture but no features. Only one of the 151 prehistoric sites, 5JA318, was put in this category. It is a Late Prehistoric site located on a knoll overlooking Antelope Spring and Case Flats in the middle of North Park. Six circular stone structures and two artifacts, a chopper and a projectile point, were found on the site.

The statistical analysis of the environmental variables failed to reveal a significant association of any variables with the site, except for a significantly high value for the dry mountain loam/valley bench range site.

The function of the site is indeterminate. The lack of artifacts indicates that the site was not residential and the average number of stones in each circle, about 100, is much higher than average. The possible functions of circular stone structures are dealt with more

fully in the discussion of site type 8.

Site Type 6

Two of the prehistoric sites fit in this category, 5JA315 and 5JA326. They are limited activity sites with features and architecture. Site 5JA315 is located on a hill overlooking Grizzly and Little Grizzly Creeks. There are six stone circles and two rock cairns scattered over a wide area. A light lithic scatter is associated with the site. Site 5JA326 is located on a ridge overlooking Antelope Spring and consists of one stone circle, a cairn and a relatively diffuse rock pile. No artifacts were found on the site.

Site type 6 exhibits high means for the dry mountain loam/valley bench range site, overview and big game. The good overview and association with big game suggests some connection with hunting activities. The association between a limited artifact component, stone circles, overview and big game suggests that the circles are the remains of hunting blinds. The possible functions of these sites are discussed further in the treatment of site type 8.

Site Type 7

Only one site, 5JA311, is in this category. Located on a ridge between Grizzly and Little Grizzly Creeks, the site consists of three stone circles, two cairns, a more amorphous arrangement of stones and an extensive lithic scatter. Diagnostic artifacts of the Late Prehistoric

period were found on the site.

In retrospect, it appears that the site should have been classified as a type 8 site. The stone circles, however, are somewhat different from others found in North Park in that the size of the sandstone blocks making up the circles are somewhat larger than average.

The catchment area around the site includes more of the mountain shale range site than average and there is a positive association with overview and cutting tools. Plant food and small game values are lower than the averages for any other site type (cf. Table 15).

The artifact variety and presence of stone circles suggest that the site was a campsite, but the low plant food and small game values run counter to our expectations for campsites. The surveyors felt that the stone rings were not the remains of residential structures and possibly represented some kind of ceremonial activity.

Site Type 8

Three sites were classified as type 8 sites: 5JA47, 5JA182 and 5JA312. Site 5JA182 is Middle Archaic, 5JA312 is Late Archaic and 5JA47 is a multicomponent site with Middle and Late Archaic and Late Prehistoric components. 5JA182 is located on a ridge about 4 km. east of Pole Mountain overlooking Grizzly Creek. 5JA312 is in the same general location on a ridge overlooking Anderson Draw and Cow Creek. 5JA47 is located on Owl Ridge and it overlooks the Illinois River to the southwest and Owl Creek to the northeast. 5JA182 and 5JA312 each have one stone circle and there are 30 circular stone structures at 5JA47.

The statistical analysis shows positive associations between the site type and site elevation, vertical distance to water, overview, all potential edible plant foods and the big game index. There is a negative association with small game index and salt flats. A number of stone artifact categories are on these sites but do not show strong associations.

The high plant food values and the variety of artifact types suggest that the sites were campsites. The low small game and high big game values, however, indicate that something different may be going on in comparison with the type 4 sites, also identified as campsites.

There is considerable controversy concerning the functions of prehistoric circular stone structures. One prevailing hypothesis is that they are the remains of tipi or wickiup structures and that the stones were used to hold down the edges of hides (cf. Frison 1978:51-53). Grinnell observes that the Cheyenne used stones to hold down tipi edges in the winter when the ground was frozen but used stakes in the summer (1962:254). If they do represent residential structures, one would expect the presence of features such as hearths and multiple activity lithic scatters. Many stone circles, however, are devoid of any internal or externally associated features nor are artifacts or debitage found in association with all stone circles. It is probable that different circular stone structures represent different kinds of activities, with residential functions being only one possibility. A second possible hypothesis is that the construction of stone circles was a part of certain ceremonial activities, such as the vision quest. Toll (1913), for example, states that two Arapaho informants named a ridge

between the Illinois and Michigan Rivers as "the fasting place," implying possibly that the vision quest was pursued there. This ridge could only be Owl Ridge. One would not expect to find, however, extensive and varied lithic scatters in association with vision quests or most other ceremonial activities.

A third hypothesis is that some circular stone structures may be the remnants of hunting blinds. Benedict (1975c) reports the presence of circular stone structures at game drive sites in the Indian Peaks area of the Front Range. These consist of stone walls from 0.3 to 0.6 meters high around pits 0.2 to 1.1 meters deep. They are generally found in association with other game drive features, such as wall alignments and cairns. Charcoal layers and relatively large numbers of projectile points and flakes were found in several of the pits excavated by Benedict.

Several lines of evidence indicate that at least some of the stone circles found in North Park, particularly those at type 8 sites, were residential in nature and may represent winter occupations. According to the ethnographic evidence already presented, winter campsites of hunters and gatherers tend to be located close to big game concentrations. Since wild plant foods are generally unavailable during the winter, stored food and large and small game were the only sources of food. Big game tends to be concentrated in smaller areas during the winter in places where grasses and browse-type foods are accessible. Game movements are also more restricted in the winter by deep snow. Consequently, it would be less necessary to establish campsites far from game areas. Human mobility would also be more restricted by winter

snows, necessitating settlement closer to resources. It is presumed that snow-free areas would be favored areas for campsites, as would nearby sources of fuel. In North Park, the only areas that are consistently free of snow during the winter are the tops of ridges, south-facing slopes and the flats northeast of Walden. The only sources of wood today are woody plants in the snow-free areas and forested areas on Pole Mountain and around the margins of the Park. Other factors possibly related to winter occupation may be a reduced need for access to water sources and a good view of the surrounding countryside. Snow would provide needed water and a good overview would give better information concerning game movements for better planning of hunting forays.

The available information indicates that winter faunal densities are relatively high in North Park and some species of big game, such as deer, move into the Park from higher elevations during the winter. European settlement has undoubtedly had a significant effect on big game distributions; the main effect seen is a reduction of faunal densities. Cattlemen wintered cattle in the Park without supplemental feeding from 1879 to 1883, when a particularly severe winter wiped out most of the herds. Since then, cattle have been given supplemental feed during the winter. This indicates that wild game, which is better adapted to such conditions than cattle, would have had no trouble surviving an average winter in North Park. The winter aerial big game counts taken during 1975, 1976, 1978 and 1979 also show relatively high counts for North Park (cf. Table 6). Unfortunately, there are no available summer counts for comparison. The winter counts also show a concentration of big game

in areas where winds and southern exposures have cleared large areas of snow. The locations of these areas are not likely to have been affected too much by historic occupation because they are dependent mainly on wind and exposure patterns.

If we consider the factors cited above in combination, we should expect to find winter occupations in snow-free areas on ridges adjacent to south-facing slopes, close to winter concentrations of big game and close to sources of wood. Two sites whose locations fit the description are 5JA47 and 5JA25. The latter site, which is outside the survey areas and was not included in the statistical analysis, is on a ridge on the southeast side of Independence Mountain overlooking the north end of North Park. There are 28 stone circles on the site and it would probably be classified as a type 8 site except that it has been swept clean of artifacts and debitage by collectors. 5JA47 is the previously described site on Owl Ridge. Both sites are located near extensive south-facing slopes that are generally clear of snow in the winter. Both sites are also located near two of the highest deer and elk winter concentrations in North Park (cf. Table 6). There are substantial wooded areas within 1/2 km. of 5JA25 and about 3.5 km. southeast of 5JA47 along Owl Ridge. We might also speculate that the description of Owl Ridge as "the fasting place" by the Arapaho refers to the possibility of occasional food shortages during winter occupations. The critical winter distribution of elk and deer in North Park, existing woodlands and the locations of all known sites with circular stone structures are mapped in Figure 14. The map shows a general association between the distributions with the exception of the three sites on

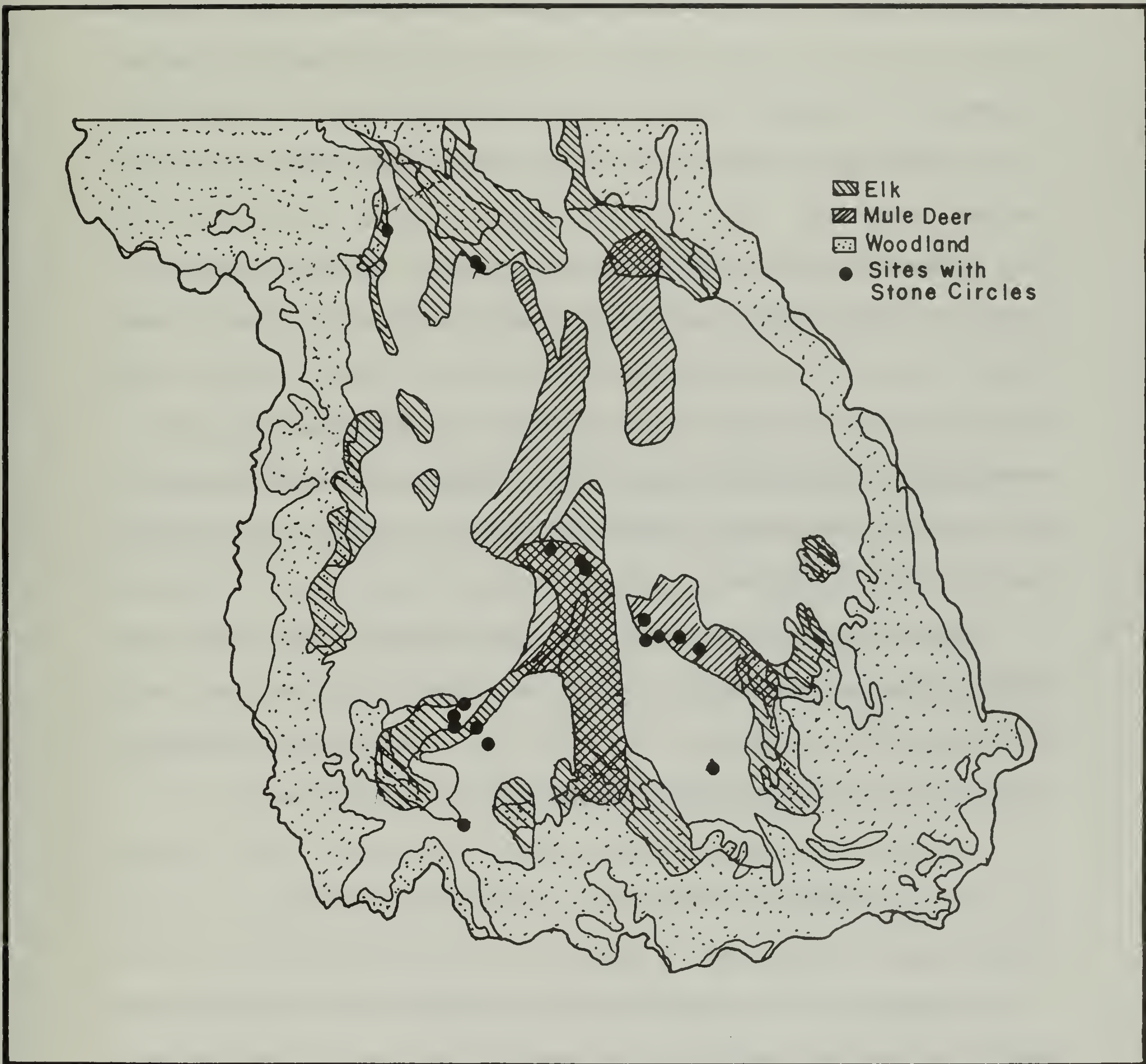

Figure 14. Distribution in North Park of all known stone circle sites, woodlands and critical winter ranges of Mule Deer and Elk.

Peterson Ridge, which are located far from known wood sources. These three sites, however, have limited artifact inventories and may not be residential. The site with nine stone circles located in the southeast corner of the Park is the only site not directly associated with any of the distributions.

If the hypothesis outlined above is correct, multiple activity sites with stone circles and features should be found on ridges in the Buffalo Peak area in the south end of the Park, on Johnny Moore Mountain, in the extreme northeast corner of the Park and along the western side of North Park west of Sheep Mountain and Delaney Butte. One site with stone circles reportedly exists on Delaney Butte but the exact location is unknown.

The high plant biomass values for type 8 sites do not support the winter occupation hypothesis, since it is assumed that plant foods were not exploited in the winter. These same high biomass values, however, would attract mule deer and elk to the area during the winter.

VISUAL OBSERVATIONS OF SETTLEMENT PATTERNS

An adequate visual examination of settlement patterns would require making overlays of sites on each topographic map, each overlay including sites and components of one temporal period with each site identified by site type. The time and resources to do this, however, were not available for this report. A preliminary examination of site distributions in the survey areas on the USGS 7 1/2' topographic maps shows six general areas of site concentration. These are: around

Hebron Sloughs, on a hill north of Hebron Sloughs, on ridges east and northeast of Pole Mountain, on Peterson Ridge south of Case Flats, on Owl Ridge, and around Road Spring at the head of Sudduth Draw. Site density was notably low in the survey areas in and around the North McCallum Oil Field southeast of the Canadian River. No explanation has been found yet for the low site density in this area. A relatively high site density has been found by Gordon and Kranzush (1978) in the North Sand Hills.

The six individual site concentrations listed above do not, on preliminary observation, appear to be limited to particular temporal periods or site types, with the exception of Owl Ridge. Also, there are no type 2 sites in the vicinity of Road Spring. The field crew did speculate that site 5JA166 around Road Spring may have been a game drive. It is a type 4 site, however, which would be more indicative of residential occupation.

Each of the site concentrations, with the exception of Owl Ridge, includes a full range of site types, from residential occupation to special activity sites. Owl Ridge is probably an exception only because none of the surrounding area was included in the survey. Several sites have reportedly been recently recorded just north of Owl Ridge by the Laboratory of Public Archaeology at Colorado State University but these reports were not received in time to be included in this analysis.

The general lack of sites in the North McCallum area could perhaps be explained by a more complete investigation of the environment of that area. One possible technique might be to measure the environmental variables of a certain number of randomly located catchment circles in

that area and compare these with the known sites in North Park.

There is good evidence of temporal variation in settlement patterns in the Hebron Sloughs area. The Hebron Sloughs are a group of intermittent playa lakes scattered through a basin bordered by eroded ridges and low hills. The floor of the basin is between the 8140 and 8160 foot contours and the surrounding ridges and hills have elevations generally above 8200 feet. Twenty-seven of the sites in the area have dated components and six of these contain late Paleoindian components. All six Paleoindian sites are located above the 8200 foot contour and the remaining dated sites are distributed above and below that contour. The absence of Paleoindian sites on the floor of the basin suggests that the basin may have contained more water in Paleoindian times and that the present playa lakes are the remnants of a large post-Pleistocene lake.

SUMMARY OF SUBSISTENCE-SETTLEMENT ANALYSIS

The 151 prehistoric sites recorded during the North Park Project represent five periods of occupation from the Late Paleoindian to the Late Prehistoric periods. The sites were classified into 8 descriptive site types. Sites of different periods and different site types were compared with respect to the frequencies of different artifact classes and environmental characteristics of the sites and their presumed catchment areas.

There was little overall variation between sites of different periods with respect to environmental characteristics. If the

distribution of resources in North Park remained relatively constant through time, this would indicate that there was little change in site locations through time with respect to the distribution of exploited resources. If climate and resource distribution did change through time, however, the hypothesis carries little weight. Small scale changes in site locations through time occurred in the Hebron Sloughs area. Late Paleoindian sites in that area are located at or above the 8200 foot contour while sites of later periods are also located below that contour in the Hebron Sloughs depression. This change in site location appears to be related to the presence of a post-Pleistocene lake in the depression that became much reduced in size after the late Paleoindian period. It is not known whether the reduction in size of the lake occurred in response to climatic changes or a change in local drainage patterns.

The frequencies of several artifact classes do show consistent variation through time. The average site frequencies of manos and metates tend to decrease from early to late periods, indicating a possible change in food processing techniques, exploitation patterns or possibly increasing sophistication of mano and metate manufacturing technique.

It is probable that there was some population increase in the Park through time, which is suggested by the increase in number of site components from period to period. The ratio of limited activity to multiple activity sites remains relatively constant for all periods of occupation and there does not appear to be any noticeable concentration of sites of particular periods in specific areas, except for a slightly

greater frequency of late Paleoindian components in the Hebron Sloughs area. This suggests a locational shift in subsistence activities coincident with the disappearance of the post-Pleistocene lake in the Hebron Sloughs depression.

Comparison between site types indicates that multiple activity sites with features, which may be base camps, tend to be located in areas with higher concentrations of potential edible vegetative resources and high small game densities. Limited activity sites with no features, in contrast, tend to be located in areas with lower overall concentrations of potential edible plant resources. This pattern supports our initial hypothesis that base camps tend to be located in areas with high concentrations of low prestige, high security resources. It also indicates that wild plant foods were an important part of the diet of prehistoric inhabitants of the Park.

An alternative hypothesis was that base camps were located in areas with high vegetative diversity. This hypothesis is not supported by the analysis. Instead, type 2 limited activity sites tend to be located in such areas. This suggests that basic food gathering activities were carried out from base camps and that the limited activity sites were the locus of more specialized exploitative activities. The analysis did not reveal any associations of specific artifact classes with limited activity sites that would have helped to ascertain the kinds of activities that were carried out at these sites. In fact, there were no significant correlations of artifact types with other variables (manos with high grass biomass, for example).

It is probable that North Park was occupied by prehistoric groups

mainly during the summertime. Site excavation would be necessary to get more detailed information on seasonality of occupation. The locations and characteristics of several sites, however, suggests some degree of winter occupation. Two sites in particular have relatively high numbers of circular stone structures, are located on ridges that are largely free of snow in the winter, are located near wood supplies and are in close proximity to high density deer and elk wintering areas.

No sites were found in the survey areas that were clearly related to hunting activities, such as butchering sites, game drives or other type of kill site. There is, however, one well known kill site outside the survey area at the extreme north end of the Park. Again, excavation is required to determine in greater detail kinds of subsistence activities and proportions of different foods in the diet.

The results of the North Park Project have shown that there was substantially greater prehistoric occupation of the Park than had been suspected. This occupation began as early as the late Paleoindian period and continued to historic times. Several hypotheses concerning settlement and subsistence patterns were formulated at the beginning of the project. A few of these are clearly substantiated by the results, others have been rejected and there is only suggestive evidence in other cases. The results of the anlaysis have also suggested several new lines of investigation for future research in North Park and similar areas. A predictive site settlement model could not be generated due to biases in the survey sample, but it is felt that the results suggest the form that such a model might take.

IX. Conclusions and Recommendations for Future Research

IX. CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

by Joseph J. Lischka

RESULTS OF THE SURVEY AND TESTING PROGRAM

A total of 151 prehistoric sites and 14 historic sites were recorded during an archaeological survey of 25,100 acres in North Park, Jackson County, Colorado. The area surveyed was distributed among a number of parcels in the southwest, northeast and east-central parts of North Park. The selection of the areas surveyed was dictated by the necessity of evaluating the cultural resources in potential coal production areas of the Park. Consequently, the survey areas do not constitute a representative sample of the North Park area with respect to any environmental variables that might be relevant to prehistoric or historic settlement patterns. Irrigated hay fields, which constitute approximately 20% of the area of the Park floor, are only minimally represented in the survey area. These hay fields cover almost all flood plains and riparian micro-environments in North Park and, consequently, prehistoric occupation and utilization of this important part of the environment is still unknown.

The prehistoric sites were grouped into a set of descriptive site types and the associations between each site type and a set of environmental and artifact variables were analyzed. The results of the analysis were then used to make a determination of site functions and to investigate temporal changes in site patterning.

Because the survey was nonrepresentative and only covered 3.3% of the Park area, the results of the settlement system analysis cannot be taken as definitive. They should, instead, be considered as trend indicators and suggestions for future research.

THE ARTIFACT ANALYSIS

All patterned stone tools and retouched/utilized flakes were collected from the prehistoric sites recorded during the survey, and a selected number of nonutilized flakes were also collected. The artifacts were grouped into artifact categories based on morphological attributes and the presence or absence of edge damage presumed to be indicative of use. Ceramic sherds were recovered from three prehistoric sites.

The functional analysis of the stone artifacts was based on inspection of use-wear patterns on artifact edges. Difficulties were encountered in making consistent identifications of types of use-wear, probably because more than one person conducted the visual inspection of the use-wear and relatively low magnifications were used for the visual inspection. Also, naturally caused edge damage may have obscured use-wear patterns. Perhaps the biggest difficulty was the lack of time needed to fully analyze the large number of artifacts and retouched flakes. It would probably have been more practical, in retrospect, to analyze only the patterned stone tools and a sample of the retouched flakes from each site.

The prehistoric site chronology was facilitated by the presence of

diagnostic projectile points on a relatively large number of sites. Eighty-seven of the 151 prehistoric sites had one or more dated components, based on the analysis of the diagnostic projectile points and the ceramics. Of the total number of 129 components, 12 are Late Paleoindian, 13 are Early Archaic, 23 are Middle Archaic, 41 are Late Archaic and 39 are Late Prehistoric. Sixty-one sites are single component and 26 are multicomponent.

North Park is peripheral to several archaeological culture areas and it was assumed initially that prehistoric occupation of the Park would exhibit connections with the Plains area to the east and the Great Basin to the west. During proto-historic times, North Park was considered to be a part of Ute territory, but the Arapaho and other Plains groups began pushing into North Park and other mountain areas in the late eighteenth and early nineteenth centuries. Prehistoric ceramics found in the Park also indicate connections both to the east and west. Sherds from two of the sites recorded during the North Park Project indicate Plains Woodland affiliations. Other sherds are similar to Shoshonean wares in western Colorado and in Wyoming. Several Pueblo II Anasazi sherds found by local residents in the north end of the Park show some connection with the Mesa Verde or Kayenta areas of the Four Corners reigon, and they suggest that at least some of the occupants of the Park were from the west slope or had contacts with groups there.

The North Park projectile points were compared primarily with point styles of the Northwestern Plains area, because the most complete point chronologies are found in that area and because at least some of the North Park components are likely to have been affiliated with that area.

Comparisons with Great Basin point styles, however, were also made.

THE SETTLEMENT SYSTEM ANALYSIS

It was assumed that the locations of prehistoric and historic sites in North Park are related to various features of the environment. The kinds of environmental variables used in the analysis included topographic features, water sources, potential wild plant food densities and the distributions of large and small game. Obviously, a prehistoric settlement system is ideally analyzed with respect to the environment existing at that time. There is not enough information at present, however, to reconstruct the paleoenvironments of North Park. Given the lack of paleoenvironmental information, existing faunal and floral distributions were used in the settlement system analysis.

The Environment

Information on vegetational patterns was obtained from range site descriptions provided by the Soil Conservation Service. Identification of potential wild plant foods was obtained primarily from the Plant Identification Network at Colorado State University. The range site descriptions, although designed for use by ranchers and farmers, provided sufficient detail for the purpose of this study. An analysis of site distributions in Middle Park indicates that soil types are better predictors of site distributions than are more inclusive vegetational-topographic zones (Fitting, et al. 1978). The results of

Fitting's analysis, if correct, substantiate the use of range site data because range site and soil type distributions correlate closely with each other.

Each range site was defined as a separate variable and the unit of measure was the area of each range site in a site's catchment circle. Also defined were variables measuring the biomass of specific categories of potential wild plant foods occurring in a site's catchment area.

Faunal information was obtained from two sources. Two variables measuring the relative abundance of big game and small game in site catchment areas were derived from evaluations made by the Soil Conservation Service of the habitat potential of each range site for various game species. The Colorado Division of Wildlife has also mapped the seasonal distributions of several wildlife species in North Park. These were not obtained in time to be used in the statistical analysis but a possible congruence between the distribution of one type of prehistoric site and winter distributions of elk and mule deer has been observed. Also used for a general interpretation of settlement patterns were winter aerial counts of elk, deer and antelope made by the Colorado Division of Wildlife. Summer wildlife distributions have been affected to a degree by ranching and agricultural activities in the Park during the last 100 years, but winter habitats probably approximate those of earlier times.

Prehistoric Settlement Systems

Eight site types were defined, based on the relative number of

artifact categories present on a site and the presence or absence of features and architecture. Several consistent associations between specific site types and environmental features were elicited by the analysis. Multiple activity sites with features and no architectural remains are located at low elevations close to water sources and their catchment areas tend to have high values for wild plant food and small game densities. These findings support the hypothesized identification of these sites as base camps and the predicted association of base camps with the kinds of food resources typically gathered by women in hunting and gathering societies. Big game values for the catchment areas of these sites tend to be low, which is in line with the hypothesis that base camps would be located some distance from big game habitats.

Multiple activity sites with features and architectural remains consisting of stone rings were also tentatively identified as base camps. These sites, however, are located on ridges and terraces some distance above the closest water source. Their catchment areas had high values for wild plant foods and big game and low values for small game. Two sites with the largest numnber of stone circles are close to the highest winter concentrations of elk and deer in North Park and are near forested areas. This suggested that they may represent winter occupations. A mapping of all known sites with circular stone structures, wooded areas and critical winter distributions of elk and deer indicates a possible association between these variables. Not all circular stone structures can be assumed to be residential, however. Some may be the remains of hunting blinds and others may have been associated with certain kinds of ceremonial activities, such as the

vision quest of the Plains area. A variety of artifact types, however, would not normally be expected on such sites.

Environmental diversity, measured in this study by the number of range sites in a catchment area, was not a significant variable except for limited activity sites with features, whose catchment areas included a significantly high number of range sites. These are thought to be specialized activity sites but the kinds of activities associated with the sites could not be determined. Potential wild plant food biomasses were not paticularly high around these sites.

Limited activity sites without features or architecture exhibited no positive associations with any of the environmental or artifact variables. Potential wild plant food densities around these sites were particularly low, indicating that primary food gathering activities were not carried out at these sites.

The range site variables did not exhibit any consistent patterns between site types, which indicates that range sites are not useful for predicting site locations. The vegetation and faunal variables derived from the range site data, however, do demonstrate consistent patterns that may be useful for predicting site locations in unsurveyed areas. There are differences in site frequencies between range sites that appear to be due to noncultural factors. The number of sites found on the bald slope range site, for example, is proportionately higher than on other range sites. This is probably due to higher erosional rates on bald slopes that cause greater exposure of cultural materials on the surface.

The environmental variables exhibiting the greatest degree of

consistent variation between site types were potential wild plant food and large and small game densities. Site elevation, horizontal and vertical distance to water, environmental diversity and overview differed between site types to some degree, while on-site slope did not exhibit any associational patterns. Variations of artifact variables and site area between site types related primarily to the defined distinction between limited activity and multiple activity sites. The variation in artifact categories was not particularly helpful in interpreting site functions.

Little temporal variation in the selection of environmental variables was observed except for a suggestive emphasis on small game during the Early Archaic, which might relate to possible reductions in big game during the Altithermal. The high small game value for Early Archaic sites, however, may be due to chance variation. Either there was little change in subsistence activities through time, or environmental changes have obscured whatever changes in subsistence activities that may have occurred.

HISTORIC SETTLEMENT PATTERNS

The 14 historic sites recorded during the survey are too few to conduct a detailed analysis of historic settlement patterns, but they are representative of known patterns of historic resource exploitation and habitation in North Park. Of particular interest is the contrast between the limited coal mining operations in the North McCallum area and the large-scale coal mines exemplified by the Coalmont and Upper

Coalmont sites. The abandonment of the Coalmont mines is probably a reflection of the shift from coal to oil and gas that occurred in the United States during the middle decades of the century. The increased demand for coal in recent years has already stimulated a new cycle of exploitation in North Park. Comparison of the remains of residential structures in Upper Coalmont were smaller and less substantial than most of the Coalmont houses. This suggests some degree of socioeconomic differentiation between the two areas. One possible pattern is that bachelors working in the mines and/or people in the lower economic brackets lived in Upper Coalmont, while married couples and those with higher paying jobs lived in Coalmont. Excavation of middens at the two sites would be a test of this hypothesis.

As small ranching outfits failed during the depression of 1929, they were bought out by the larger ranchers. This process was accelerated by the Taylor Grazing Act of 1934 as ranchers acquired land to gain access to BLM land adjacent to those properties. At least some of the homesteads recorded during the survey were probably abandoned as a result of the consolidation of ranches. A demonstration of that pattern of land acquisition would require a search of land transfers in North Park during the last 40 to 60 years.

The Spicer School was located some distance from the town of Spicer so it would be in a more centralized location with respect to population distribution in the southern part of North Park. Changes in location of the school probably occurred in response to changes in the distribution of population. As transportaiton in the Park improved, facilitated by the paving of the main highwys in the 1940's and 1950's, the outlying

schools were abandoned in favor of a consolidated school system centered in Walden. Improved transportation and the increasing mechanization of agriculture has probably continued the consolidation of ranches in North Park and has resulted in a greater concentration of population in Walden.

The fortunes of the railroad line from Laramie, while dependent in part on the transportation of cattle and hay, have waxed and waned primarily in response to the degree of coal mining activity in the Park. Established in the early years of this century during the early peak in coal mining activity, Union Pacific requested permission to abandon the line in 1964 when coal mining was at a low ebb. If coal mining again commences in the Coalmont area, it is likely that track will again be laid from Hebron to Coalmont.

RECOMMENDATIONS FOR FUTURE RESEARCH

More research is needed in the following fields of enquiry:

1) paleoenvironmental reconstruction,
2) more complete analysis of sites and isolated finds already recorded in North Park,
3) representative surveys of environmental strata, and
4) excavation of selected sites for the recovery of chronological information and investigation of exploitative patterns.

Paleoenvironmental Reconstruction

The sediments of the Hebron Sloughs playa and possibly the Case Flats playa contain fossil pollen and other microfossils that can be used to reconstruct paleoenvironments in the area. The USGS is developing techniques for the extraction of organic material from such sediments that can be used to radiocarbon date the sediments. The sediment analysis may also provide some chronological control over changes in the sizes of the lakes in these depressions. Both the Case Flats and Hebron Sloughs areas have site concentrations on the surrounding ridges and terraces that are probably related to exploitation of the lacustrine environments of those areas. Temporal control of lake development is necessary for an adequate analysis of the local settlement systems.

Although some radiocarbon dates associated with dune formation in the North and East Sand Hills areas have been obtained, more are needed to accurately pinpoint the beginning of dune formation. This is important because dune formation processes are presumably a function of specific climatic conditions, usually identified as dry conditions with a minimum of plant cover. The active dunes cover a smaller area than they did in the past and the period of most extensive dune formation needs to be determined.

Analysis of Recorded Sites

Funding limitations precluded a complete analysis of the existing

archaeological data. In particular, a more detailed analysis of environmental variation between sites and site types is needed. The 1/2 km. radius catchment areas used in this study should be expanded to catchmnent areas with radii of one to five km. or more. A more detailed investigation of faunal associations can also be made once the revision of the range site evaluations is completed by the Soil Conservation Service. More complete use of faunal data from the Colorado Division of Wildlife could also be made.

Only those sites recorded during the North Park Project were used in this study. Inclusion of all recorded sites in North Park would expand the data base and possibly clarify the observed patterns.

Analysis of the distribution of isolated finds recorded during the North Park Project and other surveys in North Park would complement the site settlement analysis and possibly real subsistence patterns and activities not exhibited by the site distributions. This could be done by conducting the same kind of associational analysis with environmental features. Any future analysis of site and isolated find locations should probably include a variable measuring topographic variability in the vicinity of a site or isolated find. This could be done by recording the highest and lowest elevations within a prescribed distance from a site or isolated find.

Representative Surveys

One limitation of surveys conducted to date in North Park is that they have all been done in response to cultural resource management

needs and do not constitute a representative sample of environmental zones in the Park. Privately owned hay fields, for example, have not been surveyed. These cover approximately 20% of the Park floor and include all riparian microenvironments along the major watercourses and almost all of the floodplain along those drainages. The skewed survey sample, consequently, has probably resulted in an incomplete picture of prehistoric settlement patterns in North Park.

A representative survey would provide input for a more complete analysis of settlement patterns and would also test the several hypotheses concerning settlement patterns that have been presented in this report. It was proposed, for example, that multiple activity sites with features and circular stone structures tend to be located on ridges and terraces close to wooded areas and winter concentrations of big game. A test of the hypothesis would require survey of areas exhibitng those characteristics and areas not exhibiting those characteristics.

A completely random selection of survey areas within the confines of the Park would be less useful than a random selection within environmental strata. There are several possible ways to define those strata. One way is to stratify by range site and sample a given percentage of each range site. A second possible approach is to map the distributions of those environmental variables that have exhibited consistent associations with the site types. Survey areas could then be selected that sampled each of those distributions, singly and in combination. Some of the variables, however, map as gradients or clines rather than as discrete areas and some difficulty might be encountered in making a random selection.

Excavation

A prehistoric temporal framework cannot be firmly established without diagnostic artifacts obtained from good stratigraphic contexts and carbon samples with good cultural associations. Most of the sites found on ridges and terraces show little promise of having clearly defined cultural stratigraphy because of a general lack of soil accumulation on those sites. Site components, when present, tend to be compressed and the contacts between strata are generally poorly defined and hard to see. The sites that appear to have the best stratigraphic potential are those at lower elevations around springs, particularly 5JA166, 5JA304 and 5JA319. The springs also appear to have been foci for cultural activity during most of the prehistoric periods. Other sites in topographic situations favoring the accumulation of colluvial or alluvial deposits may also have good cultural stratigraphy.

One chronological problem of a somewhat different nature is that of establishing seasonality of occupation at a site. It was proposed, for example, that some sites represent winter occupations. It was also suggested that game drives and surrounds may have occurred primarily in the fall. Establishing the season of occupation requires a substantial sample of floral and faunal remains. Stages of growth of immature bison, elk, deer and antelope remains in a site are particularly useful if there is a sufficient sample and if it can be assumed that the remains do not represent foods stored for any length of time. Stages of antler growth for deer and elk can also be used to establish the season, and recent studies have shown that the tooth enamel of certain species

exhibits seasonal variations. Certain fauna are available only during certain seasons, such as migratory waterfowl. Floral remains are generally less useful, since they can usually be stored for longer periods than animal foods can, but they can provide corroborative evidence.

Site catchment analyses can identify the distributions of potential resources but the resources actually used cannot be identified without analysis of faunal and floral remains obtained from undisturbed archaeological contexts. Determination of the relative quantities of resources used is generally not possible unless there is excellent preservation of organic materials and substantial quantities of those remains are available for analysis. The utilization of some resources, such as roots, tubers and forbs, may leave no remains in archaeological contexts and consequently, their utilization will not be normally detectable. Recovery of artifact assemblages found in undisturbed assocation with organic remains is necessary for analysis of artifact use and function and the relation of specific assemblages with exploitative activities. It is likely that organic remains from most of the open sites in North Park will consist primarily of the carbonized contents of firepits.

It should not be necessary to point out that information derived from both surveys and excavations can provide a more complete picture of prehistoric cultural activities than can information from only surveys or excavations.

While our investigation of historic events in North Park was somewhat limited, several possible topics for future research are

suggested. The technological aspects of coal mining are well documented in the literature and archaeological investigations probably would produce little additional information. The social aspects of coal mining, however, have been given little attention. The possible social differences between Coalmont and Upper Coalmont residential areas could be investigated by excavating trash middens in both areas. The residential occupation associated with the coal mine at 5JA145 in the North MacCallum area could also be excavated for comparison with the Coalmont and Upper Coalmont sites. At least one site - 5JA266 - offers some potential for the investigation of homesteading activities in North Park. This investigation would include both excavation of middens associated with the structure and the obtaining of information from long-time residents of the area.

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Appendix A.

POTENTIAL EDIBLE PLANT SPECIES BY RANGE SITE

APPENDIX A

SUBALPINE LOAM

Scientific Name	S.C.S. Common Name	Percent	Kg/ Hectare	Edible	Kg/Hectare Edible
Grasses:					
Festuca thurberi	Thurber Fescue	15	504	genus	126.0
Festuca idahoensis	Idaho Fescue	10	336	genus	84.0
Agropyron spp.	Wheatgrasses	10	336	genus	84.0
Bromus spp.	Native Bromes	5	168	genus	42.0
Stipa spp.	Needlegrasses	5	168		
Poa spp.	Bluegrasses	5	168	genus	42.0
Koeleria spp.	Junegrass	5	168	genus	42.0
Sitanion spp.	Squirreltail	5	168		
	Other	5	168		
Forbs:					
Lathyrus leucanthus	Aspen Peavine	5	168	genus	42.0
Lupinus spp.	Lupine	3	101	genus	25.2
Penstemon spp.	Penstemon	3	101	genus	25.2
Erigeron spp.	Fleabane	2	67		
Phlox spp.	Phlox	2	67		
	Other	5	168		
Shrubs:					
Artemisia cana	Silver Sagebrush	10	336	genus	6.7
Artemisia tridentata	Big Sagebrush			species	
Symphoricarpos spp.	Snowberry	3	101	genus	2.0
Potentilla fruticosa	Shrubby Cirquefoil	2	67	genus	1.4
		100	3360		522.5

APPENDIX A (continued)

MOUNTAIN LOAM

Scientific Name	S.C.S. Common Name	Percent	Kg/ Hectare	Edible	Kg/Hectare Edible
Grasses:					
Festuca idahoensis	Idaho Fescue	15	252	genus	63.0
Agropyron smithii	Western Wheatgrass	15	252	genus	63.0
Festuca thurberi	Thurber Fescue	8	134	genus	33.5
Koeleria spp.	Junegrass	7	118	genus	29.5
Bromus spp.	Native Bromes	5	84	genus	21.0
Agropyron trachycaulum	Slender Wheatgrass	5	84	genus	21.0
Stipa spp.	Needlegrasses	5	84		
	Other	2	34		
Forbs:					
Achillea spp.	Yarrow	2	34		
Fagopyrum spp.	Buckwheat	2	34		
Fenstemon spp.	Penstemon	2	34	genus	8.4
	Other	5	84		
Shrubs:					
Artemisia tridentata	Big Sagebrush	10	168	species	3.4
Amelanchier spp.	Serviceberry	5	84	genus	1.6
Rosa spp.	Rose	3	50	genus	1.0
Potentilla fruticosa	Shrubby Cinquefoil	3	50	genus	1.0
Symphoricarpos spp.	Snowberry	2	34	genus	0.7
Chrysothamnus humilis	Low Rabbitbrush	2	34	genus	0.7
	Other	2	34		
		100	1682		247.8

APPENDIX A (continued)

BALD SLOPES

Scientific Name	S.C.S. Common Name	Percent	Kg/ Hectare	Edible	Kg/Hectare Edible
Grasses:					
Agropyron spp.	Wheatgrasses	25	98	genus	24.50
Koeleria spp.	Junegrass	15	59	genus	14.75
Stipa comata	Needle-and-Thread	10	39		
Bouteloua gracilia	Blue Grama	5	20		
Oryzopsis hymenoides	Indian Ricegrass	5	20	species	5.00
	Other	5	20		
Forbs:					
Erigeron spp.	Fleabane	3	12		
Phlox spp.	Phlox	3	12		
Antennaria spp.	Pussytoes	3	12	genus	3.00
Fagopyrum spp.	Buckwheat	2	8		
	Other	4	16		
Shrubs:					
Artemisia frigida	Fringed Sage	10	39	species	0.78
Ceratoides lanata	Winterfat	5	20		
Chrysothamnus humilis	Low Rabbitbrush	5	20	genus	0.40
		100	395		48.43

APPENDIX A (continued)

MOUNTAIN SHALE

Scientific Name	S.C.S. Common Name	Percent	Kg/ Hectare	Edible	Kg/Hectare Edible
Grasses:					
Agropyron spp.	Wheatgrasses	20	112	genus	28.0
Poa fendleriana	Muttongrass	10	56	species	14.0
Oryzopsis hymenoides	Indian Ricegrass	7	39	species	9.8
Koeleria spp.	Junegrass	5	28	genus	7.0
Sitanion spp.	Squirreltail	5	28		
Poa secunda	Sandberg Bluegrass	5	28	genus	7.0
	Other	5	28		
Forbs:					
Allium spp.	Onion	3	17	genus	4.2
Castilleja spp.	Paintbrush	3	17		
Astragalus spp.	Milkvetch	3	17	genus	4.2
Fagopyrum spp.	Buckwheat	3	17		
Phlox spp.	Phlox	3	17		
	Other	5	28		
Shrubs:					
Artemisia tridentata	Big Sagebrush	10	56	species	1.12
Amelanchier spp.	Serviceberry	5	28	genus	.56
Chrysothamnus viscidiflorus	Douglas Rabbitbrush	5	28	species	.56
	Other	3	17		
		100	557		76.44

APPENDIX A (continued)

DEEP CLAY LOAM

Scientific Name	S.C.S. Common Name	Percent	Kg/ ectare	Edible	Kg/Hectare Edible
Grasses:					
Agropyron spp.	Wheatgrasses	15	336	genus	84.0
Festuca idahoensis	Idaho Fescue	10	224	genus	56.0
Festuca thurberi	Thurber Fescue	10	224	genus	56.0
Poa fendleriana	Muttongrass	5	112	species	28.0
Oryzopsis hymenoides	Indian Ricegrass	5	112	species	28.0
Koeleria spp.	Junegrass	5	112	genus	28.0
	Other	5	112		
Forbs:					
Lathyrus leucanthus	Aspen Peavine	3	67	genus	16.75
Erigeron spp.	Fleabane	2	45	genus	11.25
Fagopyrum spp.	Buckwheat	2	45		
	Other	7	157		
Shrubs:					
Artemisia tridentata	Big Sagebrush	10	224	species	4.48
Artemisia cana	Silver Sagebrush			genus	
Amelanchier spp.	Serviceberry	8	179	genus	3.58
Symphoricarpos spp.	Snowberry	5	112	genus	2.24
Rosa spp.	Rose	3	67	genus	1.34
	Other	5	112		
		100	2240		319.64

APPENDIX A (continued)

ROCKY LOAM

Scientific Name	S.C.S. Common Name	Percent	Kg/ Hectare	Edible	Kg/Hectare Edible
Grasses:					
Agropyron spp.	Wheatgrasses	10	106	genus	26.50
Oryzopsis hymenoides	Indian Ricegrass	10	106	species	26.50
Festuca ovina	Sheep Fescue	10	106	species	26.50
Festuca idahoensis	Idaho Fescue	10	106	genus	26.50
Muhlenbergia montana	Mountain Muhly	10	106		
Koeleria spp.	Junegrass	5	53	genus	13.25
	Other	6	64		
Forbs:					
Phlox spp.	Phlox	5	53		
Aster spp.	Aster	3	32	genus	8.00
Erigeron spp.	Fleabane	3	32		
Lupinus spp.	Lupine	2	21	genus	5.25
	Other	5	53		
Shrubs:					
Artemisia tridentata	Big Sagebrush	10	106	species	2.12
Chrysothamnus humilis	Low Rabbitbrush	5	53	genus	1.06
Artemisia frigida	Fringed Sage	3	32	genus	.64
	Other	3	32		
		100	1061		136.32

APPENDIX A (continued)

DRY MOUNTAIN LOAM

Scientific Name	S.C.S. Common Name	Percent	Kg/ Hectare	Edible	Kg/Hectare Edible
Grasses:					
Agropyron riparium	Streambank Wheatgrass	15	134	genus	33.5
Festuca ovina	Sheep Fescue	10	90	species	22.5
Poa fendleriana	Muttongrass	10	90	species	22.5
Stipa pinetorum	Pine Needlegrass	8	72		
Stipa lettermani	Letterman Needlegrass	5	45		
Poa secunda	Sandberg Bluegrass	3	27	genus	6.75
	Other	5	45		
Forbs:					
Lupinus spp.	Lupine	3	27	genus	6.75
Antennaria spp.	Pussytoes	3	27	genus	6.75
Aster spp.	Aster	3	27	genus	6.75
Erigeron spp.	Fleabane	3	27		
Achillea spp.	Yarrow	2	18		
Mertensia spp.	Bluebells	2	18		
Fagopyrum spp.	Buckwheat	1	9		
Phlox spp.	Phlox	1	9		
	Other	3	27		
Shrubs:					
Artemisia tridentata	Big Sagebrush	15	134	species	2.68
Purshia spp.	Bitterbrush	5	45		
Chrysothamnus humilis	Low Rabbitbrush	3	27	genus	0.54
		100	898		108.72

APPENDIX A (continued)

VALLEY BENCH

Scientific Name	S.C.S. Common Name	Percent	Kg/ Hectare	Edible	Kg/Hectare Edible
Grasses:					
Agropyron riparium	Streambank Wheatgrass	20	146	genus	36.5
Poa fendleriana	Muttongrass	15	109	species	27.25
Koeleria spp.	Junegrass	10	73	genus	18.25
Oryzopsis hymenoides	Indian Ricegrass	9	66	species	16.50
Stipa pinetorum	Pine Needlegrass	5	36		
	Other	5	36		
Forbs:					
Fagopyrum spp.	Buckwheat	5	36		
Phlox spp.	Phlox	5	36		
Antennaria spp.	Pussytoes	3	22	genus	5.50
	Other	5	36		
Shrubs:					
Artemisia tridentata	Big Sagebrush	15	109	species	2.18
Chrysothamnus viscidiflorus	Douglas Rabbitbrush	3	22	species	0.44
		100	727		106.62

APPENDIX A (continued)

CLAYPAN

Scientific Name	S.C.S. Common Name	Percent	Kg/ Hectare	Edible	Kg/Hectare Edible
Grasses:					
Agropyron riparium	Streambank Wheatgrass	15	92	genus	23.00
Koeleria spp.	Junegrass	10	62	genus	15.50
Poa fendleriana	Muttongrass	10	62	species	15.50
Agropyron spicatum	Bluebunch Wheatgrass	5	31	genus	7.75
	Other	6	37		
Forbs:					
Aster spp.	Aster	2	12	genus	3.00
Sedum spp.	Sedum	2	12		
Antennaria spp.	Pussytoes	2	12	genus	3.00
	Other	5	31		
Shrubs:					
Artemisia longiloba	Alkali Sagebrush	30	185	genus	3.70
Atriplex corrugata	Mat Saltbush	5	31	genus	0.62
Ceratoides lanata	Winterfat	5	31		
	Other	3	18		
		100	616		72.07

APPENDIX A (continued)

MOUNTAIN MEADOW

Scientific Name	S.C.S. Common Name	Percent	Kg/ Hectare	Edible	Kg/Hectare Edible
Grasses:					
Festuca thurberi	Thurber Fescue	20	672	genus	168.00
Deschampsia caespitosa	Tufted Hairgrass	12	403	species	100.75
Agropyron trachycaulum	Slender Wheatgrass	10	336	genus	84.00
Carex spp.	Sedges	5	168	genus	42.00
Forbs:					
Iris spp.	Iris	3	101		
Potentilla spp.	Herbaceous Cinquefoil	3	101	genus	25.25
Achillea spp.	Yarrow	2	67		
	Other	15	504		
Shrubs:					
Salix spp.	Willow	10	336		
Potentilla fruticosa	Shrubby Cinquefoil	10	336	genus	6.72
Artemisia cana	Silver Sage	5	168	genus	3.36
	Other	5	168		
		100	3360		430.08

APPENDIX A (continued)

ALKALINE SLOPES

Scientific Name	S.C.S. Common Name	Percent	Kg/ Hectare	Edible	Kg/Hectare Edible
Grasses:					
Agropyron spp.	Wheatgrasses	15	84	genus	21.00
Distichilis spp.	Saltgrass	10	56		
Oryzopsis hymenoides	Indian Ricegrass	10	56	species	14.00
Sitanion spp.	Squirreltail	10	56		
Stipa pinetorum	Pine Needlegrass	5	28		
Poa spp.	Blue Grasses	5	28	genus	7.00
	Other	10	56		
Forbs:					
		5	28		
Shrubs:					
Sarcobatus spp.	Greasewood	10	56	genus	1.12
Artemisia tridentata	Big Sagebrush	15	84	species	1.68
	Other	5	28		
		100	560		44.80

APPENDIX A (continued)

SALT FLATS

Scientific Name	S.C.S. Common Name	Percent	Kg/ Hectare	Edible	Kg/Hectare Edible
Grasses:					
Agropyron smithii	Western Wheatgrass	25	196	genus	49.00
Distichilis spp.	Saltgrass	20	157		
Oryzopsis hymenoides	Indian Ricegrass	5	39	species	9.75
Poa juncifolia	Alkali Bluegrass	5	39	genus	9.75
Puccinellia spp.	Alkali Grass	5	39	genus	9.75
	Other	5	39		
Forbs:		10	78		
Shrubs:					
Sarcobatus spp.	Greasewood	10	78	genus	1.56
Ceratoides lanata	Winterfat	5	39		
Atriplex corrugata	Mat Saltbush	5	39	genus	0.78
	Other	5	39		
		100	782		80.59

APPENDIX A (continued)

SANDY BENCH

Scientific Name	S.C.S. Common Name	Percent	Kg/ Hectare	Edible	Kg/Hectare Edible
Grasses:					
Agropyron spp.	Wheatgrasses	15	150	genus	37.5
Calamagrostis montanensis	Plains Reedgrass	10	100		
Poa Fendleriana	Muttongrass	10	100	species	25.0
Poa secunda	Sandberg Bluegrass	5	50	genus	12.5
Sitanion spp.	Squirreltail	5	50		
Stipa comata	Needle-and-Thread	5	50		
Oryzopsis hymenoides	Indian Ricegrass	5	50	species	12.5
Koeleria spp.	Junegrass	5	50	genus	12.5
Bouteloua gracilis	Blue Grama	5	50		
	Other	5	50		
Forbs:					
Penstemon spp.	Penstemon	3	30	genus	7.5
Antennaria spp.	Pussytoes	3	30	genus	7.5
Fagopyrum spp.	Buckwheat	2	20		
Aster spp.	Aster	2	20	genus	5.0
	Other	5	50		
Shrubs:					
Artemisia tridentata	Big Sagebrush	10	100	species	2.0
Amelanchier spp.	Serviceberry	5	50	genus	1.0
		100	1000		123.0

APPENDIX A (continued)

WOODLAND UNDERSTORY

Scientific Name	S.C.S. Common Name	Percent	Kg/ Hectare	Edible	Kg/Hectare Edible
Grasslike:					
Carex geyeri	Elk Sedge	15	34	genus	8.50
Berberis repens	Oregon Grape	10	22	species	5.50
Forbs:					
Arnica cordifolia	Heartleaf Arnica	20	45		
Lupinus spp.	Lupine	5	11	genus	2.75
Shrubs:					
Vaccinium spp.	Vaccinium	20	45	genus	0.90
Fragaria spp.	Strawberry	5	11	genus	0.22
Juniperus spp.	Juniper	5	11	genus	0.22
Shepherdia canadensis	Buffaloberry	5	11	species	0.22
Arctostaphylos uva-ursi	Kinnikinnick	5	11	species	0.22
Other:		10	22		
		100	223		18.53

Appendix B.

HISTORIC SITE DESCRIPTION

The 14 historic sites recorded during the survey represent a range of economic and settlement activities, all related to European, as opposed to aboriginal, occupation in North Park. Historic references were obtained on a few of the sites but information on most of the sites was limited to site contents. Site descriptions are presented below.

Site 5JA145

This site, located in the North MacCallum area, consists of the remains of a small underground coal mine and the remains of a small structure located about 70 meters southeast of the mine. The structure is assumed to be residential in nature because an associated midden contained a number of bottle fragments, buttons, forks, spoons, tin can fragments and a piece of nickel-plated trim from a wood-fired kitchen stove. The piece of trim had the word "Closet" on it, which indicates that the stove had a warming compartment. Some of the glass bottle fragments had the purple tinge characteristic of pre-World War I glass. A lid from a coffee can had the words "Morado Coffee" and "The Morey Merc. Co., Denver" embossed on it. This brand of coffee was produced by the company in 1914 but it is not known when they started making it or discontinued it. A Colorado license plate dated 1930 was also found on the site. The flatware appears to be of pre-World War I manufacture, judging from the illustrations in Sears, Roebuck & Co. catalogs of that period.

Based on the above information, it is estimated that the coal mine began operation sometime around the turn of the century or a little

after and may have continued in operation until at least 1930. The last date is somewhat tenuous because old cars are often abandoned near abandoned sites and the license plate may be related to such an abandonment. It is known, hwoever, that several small coal mines supplying coal to local residents were in operation in the general area during that period. The Sudduth Mine, for example, which is located several miles away, was in operation from about 1885 to 1930 and supplied coal for local residents (Dave Sudduth: personal communication).

Site 5JA188 (The Spicer School)

This site consists of a hewn log structure with an attached shed and a privy located about 30 meters northwest of the structure. According to Mr. Oliver Meyring, a local resident, this structure is the Spicer School. The structure, however, is about 1 1/2 miles SSW of the Spicer School location noted on the most recent USGS 7 1/2' topographic map. The townsite of Spicer is several miles southwest of the site, on Colorado Highway 14. According to Mr. Meyring, however, the building has been moved several times, so that the school would be located centrally with respect to the population served by the school. The presence of the privy and a well indicate that the school was in operation for some time at that location. No information could be found on when the school was started or when it was abandoned. The town of Spicer, however, was established in 1884 and the school system was consolidated sometime during the 1950's, which may provide some limiting dates for

the school operation.

Hewn logs were used for the framing of the roof, the walls and the floor beams. The roof, floor, door trim, and attached shed are of saw-cut lumber. The wall logs are square, are notched on the ends and are chinked with a mortar of sand, ash, clay and possibly lime. All of the nails are wire nails. The one room structure is in relatively good condition with only the door and window glass missing. Few artifacts were found in or around the structure. A mano and endscraper were found about 10 meters from the schoolhouse but were probably brought there and discarded by students since no other evidence of prehistoric activity was found. Grades 1 through 8 were taught at the Spicer School.

Site 5JA189

This site consists of the remains of a house and associated outbuildings in the south end of North Park. The main part of the house consists of four rooms and was framed with round logs. The walls are of sawn lumber. An addition to the house was constructed of 2 x 4's and hewn timbers probably salvaged from a structure elsewhere. The inner walls of the house have been papered with newspapers and magazine papers, the earliest of these dating back to 1906. Artifacts observed were crimped seam cans, wire nails, fragments of wet cell batteries (in the basement), a water pump, water heater, coal or wood kitchen stove, bottles with seamed lips and applied lips, and a 1943 _Time_ magazine. The house, then, was constructed at least as early as 1906 and was occupied into the 1940's. The glass battery fragments indicate that a

home electrical system was in operation at one time, probably incorporating a windmill generator.

Site 5JA236

This site, located in the southwest part of the Park, is a scatter of glass bottle fragments and animal bones covering about 1/4 section. Also found in this scatter was an aluminum can cap and a decorative fragment of sculptured cast iron showing two goats facing each other but sharing the same head. The phrase "two kids" appears on the base of the fragment. Several of the glass bottle fragments are purple.

The site is thought to be a trash dump dating primarily from the early part of the 20th century with some later additions. No associated structural remains were found.

Site 5JA251

This is an historic site in the Hebron Sloughs area that consists of two features, the foundation of a rectangular log structure with sandstone slabs set against the west side and a cellar dug into the side of a ridge about 25 meters from the log structure. The area is now used as a garbage dump and no artifacts were found that are likely to be associated with occupation of the site. Consequently, no estimate could be made of the age of the site. The site is located about 1/2 mile south of a presently occupied ranch house.

The site is thought to be an abandoned homestead.

Site 5JA252

This site, located in the Hebron Sloughs area, is a localized concentration of historic debris, probably a dump site. The site recorders speculate that it may be the remains of a herder's camp. Artifacts found include a pail, ceramic jug fragments, tin cans (crimped seams), a paint brush, several mason jar lids, a coffee pot, the insides of a watch and several fragments of shoe leather.

Little definite can be said concerning the period of occupation but the degree of preservation indicates that it is a post-World War I site.

Site 5JA265

This site is comprised of both historic and prehistoric components. Located in the Hebron Sloughs area, the historic material consists of a scatter of wood, possibly from a deteriorated structure, and associated fragments of purple glass. About 70 meters southeast of the wood scatter is a partially filled in hole in the side of the ridge, possibly a root cellar. The purple glass indicates that the site is pre-World War I but the general lack of artifacts does not permit a positive evaluation of the function of the site.

Site 5JA266

This site is a log cabin located on a terrace above Grizzly Creek in the southwest part of North Park. The cabin, which measures 20

meters by 13 meters, is set on a sandstone slab foundation. The logs are handhewn, dovetailed at the corners and chinked with cement. The glass and porcelain fragments scattered around the cabin indicate that it was occupied sometime during the late 19th or early 20th centuries. The site appears to have been extensively picked over by the artifact collectors.

The site is probably a homestead but there is no available information concerning who lived there and when.

Site 5JA275

This site consists of a standing wooden building with a scrap tin roof and two concrete foundations located nearby. The standing building appears to have been a garage and had a hot water tank inside. Trash scattered around the buildings included several magazines from the 1950's, a 1948 Ohio license plate and 31 Alka-Seltzer bottles. Judging from the appearance of the building and the associated artifacts, the site was a residence occupied sometime during the 1930's to the 1950's. It is not known who lived there, but at least one of the residents evidently had dyspepsia.

Site 5JA296.

This site is the abandoned coal mining community of Upper Coalmont. Located on a hillside about 1 mile south of the present townsite of Coalmont, there are several concrete buildings immediately east of a

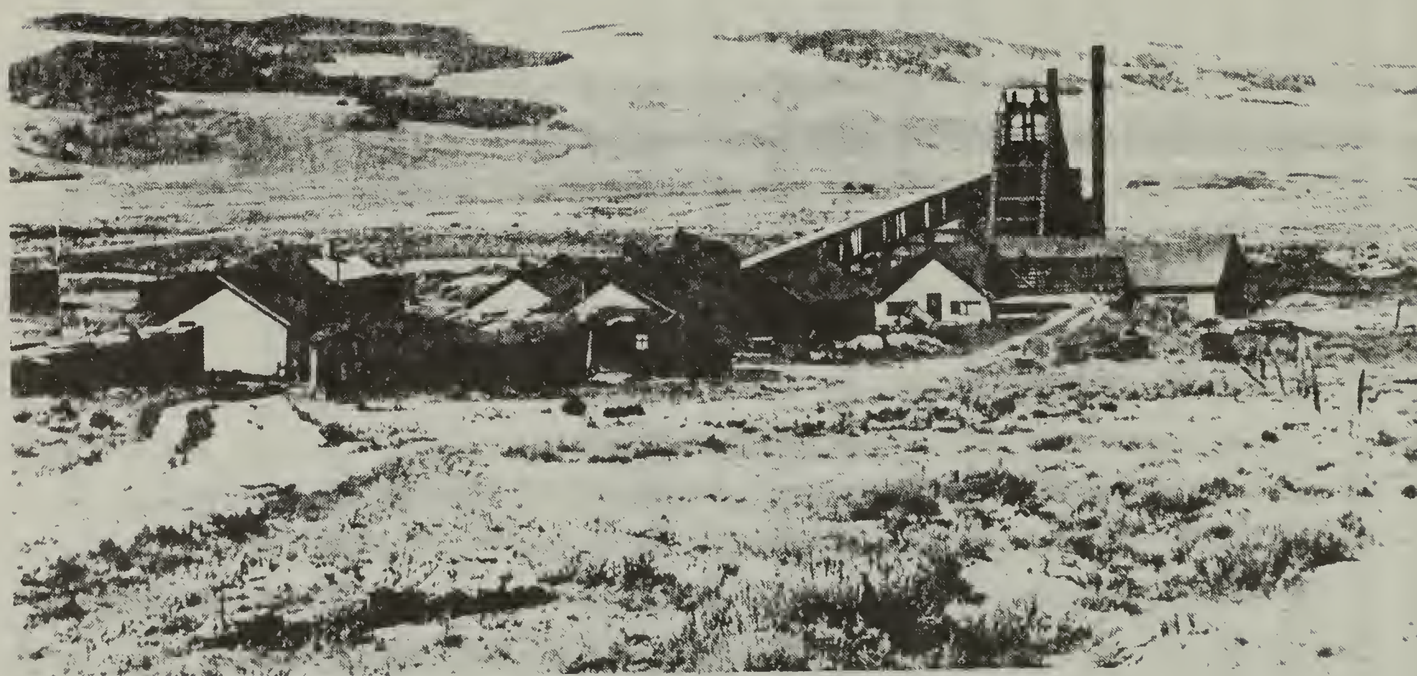


Figure B-1. Mine buildings at Upper Coalmont ca. 1930 (looking west with north slope of Pole Mountain in background).

and the railroad track between Coalmont and Hebron was taken out in 1964. There do not appear to be any year-round residents in the town at present and the post office services the surrounding ranching community. An extensive bulldozed area and coal slag heap now occupy what appeared to be the main residential area of the town, judging from old photographs of the town.

Site 5JA331

This site is an historic refuse pile located in the North MacCallum area. Historic artifacts collected include a stovepipe damper (The Adams Company, patented June 25, 1895), the lid from a 1 lb. can of Calumet Baking Powder, several tin cans with crimped seams, part of a metal toy gun, the remains of a clock and a number of bottle fragments. The age of these items appear to range from the early 20th century to relatively recent times.

Site 5JA332

This site is a log structure measuring about 4 meters by 2.5 meters and 1.5 meters high, located in a grove of aspen on a ridge northeast of Buffalo Mountain in the south end of North park. Several elk bones were found inside this structure. According to local informants, the structure functioned as a bear trap. The age of the structure could not be determined.

Site 5JA405

This site is the railroad that ran between Laramie, Wyoming and the town of Coalmont in the southwest part of North Park. The railroad, originally named the Laramie, Hahn's Peak and Pacific, was chartered on February 27, 1901. Track had been laid from Laramie to the Colorado-Wyoming state line by 1910, and three locomotives, 18 cars and a rotary plow were in operation. A sister company, the Larimer and Routt County Railway, was formed in 1907 and it extended the line from the state line through Walden and Hebron to Coalmont in 1911. The railroad companies went into receivership in 1912 and in 1914 the Colorado Wyoming and Eastern took over both properties. The name of the railroad line was changed to the Northern Colorado and Eastern in 1924 and two months later was renamed the Laramie North Park and Western. In 1936 the railroad was taken over by the Union Pacific Co., which has operated the railroad to the present time. Union Pacific petitioned for permission to abandoned the line in 1941 but permission was denied. In 1964 the track between Coalmont and Hebron was taken up (Ormes 1975). At present, trains only operate between Laramie and Walden, their primary function being the transport of coal from the active coal mines east of Walden. The railroad bed between Coalmont and Hebron is still clearly discernible in most places.

Appendix C.

ENVIRONMENTAL DATA LISTED BY SITE FOR ALL PREHISTORIC SITES

KEY FOR ENVIRONMENTAL COMPUTER
CODE NAMES

Code Name	Descriptive Term	Unit of Measurement
SITE	Smithsonian Site Number	NA
DMLVB	Dry Mountain Loam/Valley Bench	hectares
VB	Valley Bench	"
DML	Dry Mountain Loam	"
BS	Bald Slopes	"
SF	Salt Flats	"
CP	Clay Pan	"
ML	Mountain Loam	"
MS	Mountain Shale	"
DCL	Deep Clay Loam	"
MM	Mountain Meadow	"
AS	Alkaline Slopes	"
WOOD	Woodland	"
BL	Badlands	"
NORANGES	Number of ranges in site catchment area	NA
GRASS	Potential edible biomass of grasses in site catchment area	kilograms
FORBS	Potential edible biomass of forbs in site catchment area	kilograms
SHRUBS	Potential edible biomass of shrubs in site catchment area	kilograms
TOTAL	Total potential edible biomass in site catchment area; TOTAL=GRASS+FORBS+SHRUBS	kilograms
ELEV	Elevation of site above sea level	meters
HORWATER	Distance of site from nearest permanent water source	meters
VERWATER	Elevation of site above nearest permanent water source	meters
SLOPE	Slope of site	degrees
OVERVW	Site overview	degrees
SMGAME	Small game density index	NA
BGGAME	Big game density index	NA

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	DMLVB	VB	DML	BS	SF	CP	ML	MS	DCL	MM
1	6.	37.	0	0	21.	0	20.	0	0	0	0
2	47.	3.	0	0	36.	0	0	41.	0	0	0
3	143.	21.	17.	0	40.	0	0	0	0	0	0
4	144.	0	0	0	25.	0	0	0	0	0	0
5	146.	67.	0	0	7.	4.	0	0	0	0	0
6	147.	43.	0	0	0	23.	12.	0	0	0	0
7	148.	52.	0	0	0	18.	6.	2.	0	0	0
8	149.	16.	0	24.	5.	0	25.	6.	0	0	1.
9	150.	5.	0	0	5.	6.	33.	23.	0	0	5.
10	151.	28.	0	0	44.	0	0	0	0	0	6.
11	152.	23.	0	6.	34.	0	0	4.	0	0	13.
12	153.	42.	0	0	23.	14.	0	0	0	0	0
13	154.	30.	1.	0	32.	8.	0	0	0	0	8.
14	155.	38.	0	0	29.	3.	0	0	0	0	8.
15	156.	23.	0	0	36.	15.	0	0	0	0	5.
16	157.	0	31.	0	0	47.	0	0	0	0	0
17	158.	1.	0	0	1.	77.	0	0	0	0	0
18	159.	31.	0	0	15.	33.	0	0	0	0	0
19	160.	0	0	0	0	79.	0	0	0	0	0
20	161.	23.	0	0	22.	33.	0	0	0	0	0
21	162.	30.	0	0	41.	0	0	0	0	0	8.
22	163.	10.	0	40.	18.	0	5.	0	7.	0	0
23	164.	0	0	0	0	0	79.	0	0	0	0
24	165.	15.	0	0	1.	10.	53.	1.	0	0	0
25	166.	0	0	7.	0	0	55.	11.	5.	0	0
26	167.	0	0	0	0	1.	78.	0	0	0	0
27	168.	0	0	0	0	2.	75.	0	2.	0	0
28	169.	0	0	0	0	1.	77.	1.	0	0	0
29	170.	0	0	0	0	0	75.	4.	0	0	0
30	171.	0	0	0	3.	0	72.	3.	0	0	0
31	172.	50.	16.	0	13.	0	0	0	0	0	0
32	173.	0	0	0	1.	1.	77.	0	0	0	0
33	174.	0	0	0	1.	0	77.	0	0	0	0
34	175.	1.	0	0	3.	0	66.	9.	0	0	0
35	176.	37.	0	0	2.	7.	11.	16.	0	0	7.
36	177.	34.	0	0	1.	11.	20.	13.	0	0	0
37	178.	16.	0	0	2.	10.	37.	13.	0	0	0
38	179.	24.	0	0	39.	0	0	16.	0	0	0
39	180.	35.	0	0	29.	0	0	14.	0	0	0
40	181.	7.	4.	3.	18.	11.	0	0	13.	24.	0
41	182.	10.	8.	18.	19.	1.	0	0	4.	19.	0
42	183.	18.	11.	8.	7.	0	0	0	16.	17.	0
43	184.	18.	24.	2.	4.	7.	0	0	11.	14.	0
44	185.	15.	1.	45.	10.	0	0	0	1.	2.	5.
45	186.	21.	8.	23.	11.	0	0	0	10.	7.	0
46	187.	44.	5.	0	19.	0	0	0	0	0	10.
47	190.	31.	0	0	14.	33.	0	0	0	0	0
48	191.	30.	0	0	19.	30.	0	0	0	0	0
49	192.	40.	0	0	28.	11.	0	0	0	0	0
50	193.	21.	0	0	40.	18.	0	0	0	0	0
51	194.	37.	12.	0	18.	0	0	0	0	0	11.

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	DMLVB	V8	DML	BS	SF	CP	ML	MS	DCL	MM
52	195.	20.	3.	0	22.	0	25.	8.	0	0	0
53	196.	27.	1.	0	24.	0	22.	6.	0	0	0
54	197.	22.	2.	2.	28.	0	7.	16.	0	0	2.
55	198.	14.	0	0	9.	0	30.	19.	6.	0	1.
56	199.	3.	0	0	8.	0	42.	25.	0	0	0
57	200.	0	0	0	24.	10.	27.	17.	0	0	1.
58	201.	0	0	0	20.	10.	40.	8.	0	0	0
59	202.	33.	9.	0	6.	5.	0	0	0	0	25.
60	203.	36.	11.	0	16.	12.	0	0	0	2.	1.
61	205.	22.	0	0	13.	13.	0	0	0	0	30.
62	231.	27.	1.	0	34.	11.	0	0	0	0	6.
63	232.	29.	0	0	0	48.	0	0	0	0	0
64	233.	50.	0	0	22.	0	0	0	7.	0	0
65	234.	33.	20.	0	24.	2.	0	0	0	0	0
66	235.	11.	1.	18.	0	0	46.	0	0	0	0
67	237.	16.	0	0	31.	30.	0	0	0	0	0
68	238.	21.	0	0	32.	25.	0	0	0	0	0
69	239.	25.	0	0	19.	21.	0	0	0	0	14.
70	240.	17.	0	0	32.	30.	0	0	0	0	0
71	241.	37.	0	0	17.	24.	0	0	0	0	0
72	242.	5.	0	0	24.	26.	2.	0	0	0	22.
73	243.	19.	0	0	33.	0	1.	0	0	0	24.
74	244.	0	42.	0	0	1.	35.	0	0	0	0
75	245.	15.	7.	0	13.	43.	0	0	0	0	0
76	246.	41.	32.	0	0	7.	0	0	0	0	0
77	247.	21.	2.	0	6.	9.	40.	0	0	0	0
78	249.	0	19.	18.	10.	13.	18.	0	0	0	0
79	250.	0	24.	17.	11.	16.	11.	0	0	0	0
80	253.	1.	60.	6.	0	12.	0	0	0	0	0
81	254.	0	71.	0	0	7.	0	0	0	0	0
82	255.	0	35.	0	0	0	43.	0	0	0	0
83	256.	0	48.	0	0	0	30.	0	0	0	0
84	257.	0	30.	0	0	4.	44.	0	0	0	0
85	258.	24.	31.	0	24.	0	0	0	0	0	0
86	259.	42.	2.	0	14.	21.	0	0	0	0	0
87	260.	34.	4.	0	13.	27.	0	0	0	0	0
88	261.	0	0	0	25.	18.	0	0	0	0	36.
89	262.	1.	0	0	30.	6.	0	0	0	0	42.
90	263.	6.	0	0	37.	18.	0	0	0	0	18.
91	264.	0	0	0	30.	28.	0	0	0	0	21.
92	265.	12.	0	0	36.	26.	0	0	0	0	5.
93	267.	33.	30.	14.	0	0	1.	0	0	0	0
94	269.	5.	22.	1.	19.	0	6.	0	24.	0	0
95	270.	2.	14.	0	16.	0	11.	0	26.	0	1.
96	271.	27.	0	0	30.	11.	12.	0	0	0	0
97	272.	0	14.	0	0	0	65.	0	0	0	0
98	273.	0	13.	0	0	0	66.	0	0	0	0
99	274.	0	52.	0	0	0	27.	0	0	0	0
100	276.	16.	0	0	1.	0	0	0	2.	37.	0
101	277.	31.	0	0	6.	0	0	0	3.	23.	0
102	278.	36.	0	0	11.	0	0	0	1.	24.	0

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	DMLVB	VB	DML	BS	SF	CP	ML	MS	DCL	MM
103	279.	21.	0	0	5.	0	0	0	0	39.	0
104	280.	15.	0	0	0	0	0	0	4.	27.	0
105	281.	41.	0	0	17.	0	0	0	0	20.	0
106	282.	36.	0	0	11.	0	0	0	0	30.	0
107	283.	1.	0	0	17.	0	7.	0	26.	0	0
108	284.	0	11.	0	12.	0	16.	0	16.	0	2.
109	285.	5.	12.	0	22.	0	10.	0	28.	0	0
110	286.	0	0	0	16.	0	25.	0	21.	0	4.
111	287.	0	0	0	0	43.	14.	0	0	0	0
112	288.	0	35.	0	0	0	43.	0	0	0	0
113	289.	0	59.	0	0	0	20.	0	0	0	0
114	290.	0	63.	0	0	0	15.	0	0	0	0
115	291.	0	49.	0	0	0	30.	0	0	0	0
116	292.	0	60.	0	0	0	18.	0	0	0	0
117	293.	0	63.	0	0	0	16.	0	0	0	0
118	294.	0	34.	0	0	0	44.	0	0	0	0
119	295.	0	30.	0	0	0	48.	0	0	0	0
120	297.	0	0	0	0	6.	16.	0	0	0	26.
121	298.	0	0	0	0	0	35.	0	0	0	0
122	299.	0	0	0	19.	0	1.	0	0	0	0
123	300.	0	0	0	0	13.	0	0	0	0	1.
124	301.	1.	1.	0	0	0	0	0	0	0	0
125	302.	0	0	0	1.	12.	66.	0	0	0	0
126	303.	0	0	0	0	18.	60.	0	0	0	0
127	304.	33.	8.	0	5.	15.	1.	14.	0	0	2.
128	305.	18.	42.	0	2.	0	2.	11.	0	0	0
129	306.	1.	32.	0	7.	0	3.	1.	0	0	1.
130	307.	0	29.	0	13.	0	9.	3.	9.	0	1.
131	308.	33.	22.	0	1.	0	0	0	0	5.	18.
132	309.	39.	31.	0	0	0	0	0	0	8.	0
133	311.	18.	6.	0	25.	0	1.	0	27.	0	0
134	312.	30.	0	0	8.	1.	0	0	0	37.	0
135	313.	38.	0	0	15.	0	0	0	0	24.	0
136	314.	46.	0	0	22.	0	0	0	0	10.	0
137	315.	43.	8.	0	27.	0	0	0	0	0	0
138	316.	24.	42.	0	0	13.	0	0	0	0	0
139	317.	51.	2.	0	0	4.	0	21.	0	0	0
140	318.	57.	10.	0	0	1.	0	11.	0	0	0
141	319.	17.	15.	0	13.	12.	1.	18.	0	0	3.
142	320.	11.	0	0	20.	0	28.	19.	0	0	0
143	321.	49.	0	0	0	0	11.	18.	0	0	0
144	322.	39.	0	0	8.	0	10.	22.	0	0	0
145	324.	8.	0	0	45.	0	7.	19.	0	0	0
146	325.	13.	0	0	19.	0	27.	21.	0	0	0
147	326.	36.	17.	0	4.	4.	0	18.	0	0	0
148	327.	56.	6.	0	16.	0	0	0	0	0	0
149	328.	16.	16.	0	40.	0	0	0	0	0	7.
150	329.	0	0	0	0	79.	0	0	0	0	0
151	330.	31.	0	0	33.	14.	0	0	0	0	0

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	AS	WOOD	BL	NORANGES	GRASS	FORBS	SHRUBS	TOTAL	BGGAME	SMGAME
1	6.	0	0	0	3.	5594.	666.	220.	6480.	570.	230.
2	47.	0	0	0	3.	11336.	491.	397.	12223.	834.	217.
3	143.	0	0	0	3.	5359.	483.	153.	5995.	731.	135.
4	144.	0	53.	0	2.	1944.	239.	136.	2318.	254.	0
5	146.	0	0	0	3.	6839.	880.	214.	7933.	663.	310.
6	147.	0	0	0	3.	6747.	632.	238.	7616.	509.	452.
7	148.	0	0	0	4.	7284.	723.	244.	8251.	571.	425.
8	149.	0	0	0	6.	6961.	935.	296.	8192.	500.	322.
9	150.	0	0	0	6.	10763.	622.	429.	11813.	471.	368.
10	151.	0	0	0	3.	6932.	648.	196.	7776.	706.	156.
11	152.	0	0	0	5.	9955.	867.	285.	11107.	672.	229.
12	153.	0	0	0	3.	6054.	602.	185.	6840.	653.	306.
13	154.	0	0	0	5.	8213.	691.	232.	9136.	650.	258.
14	155.	0	0	0	4.	8372.	787.	238.	9397.	662.	242.
15	156.	0	0	0	4.	6910.	522.	197.	7630.	646.	277.
16	157.	0	0	0	2.	7224.	173.	204.	7601.	518.	565.
17	158.	0	0	0	3.	6870.	10.	203.	7083.	398.	776.
18	159.	0	0	0	3.	6354.	440.	192.	6986.	576.	449.
19	160.	0	0	0	1.	6894.	0	204.	7098.	393.	785.
20	161.	0	0	0	3.	6007.	361.	180.	6548.	585.	424.
21	162.	0	0	0	3.	7625.	700.	214.	8540.	694.	173.
22	163.	0	0	0	5.	5881.	1080.	215.	7176.	627.	289.
23	164.	0	0	0	1.	4837.	487.	338.	5661.	157.	314.
24	165.	0	0	0	5.	5636.	526.	301.	6463.	294.	370.
25	166.	0	0	0	4.	6960.	617.	366.	7943.	316.	332.
26	167.	0	0	0	2.	4853.	483.	337.	5672.	159.	318.
27	168.	0	0	0	3.	4892.	480.	331.	5702.	168.	325.
28	169.	0	0	0	3.	4955.	484.	339.	5778.	164.	318.
29	170.	0	0	0	2.	5451.	495.	352.	6298.	190.	318.
30	171.	0	0	0	3.	5296.	484.	341.	6120.	208.	305.
31	172.	0	0	0	3.	6786.	771.	204.	7761.	706.	249.
32	173.	0	0	0	3.	4842.	481.	335.	5658.	164.	315.
33	174.	0	0	0	2.	4816.	483.	334.	5633.	167.	309.
34	175.	0	0	0	4.	6337.	501.	365.	7203.	267.	311.
35	176.	0	0	0	6.	11155.	849.	379.	12382.	595.	391.
36	177.	0	0	0	5.	8380.	670.	324.	9375.	534.	390.
37	178.	0	0	0	5.	7816.	554.	346.	8716.	428.	382.
38	179.	0	0	0	3.	7632.	554.	252.	8438.	766.	176.
39	180.	0	0	0	3.	7840.	657.	258.	8755.	747.	213.
40	181.	0	0	0	7.	10506.	995.	392.	11893.	633.	287.
41	182.	0	0	0	7.	9777.	1157.	364.	11297.	684.	233.
42	183.	0	0	0	6.	9611.	1096.	349.	11057.	625.	265.
43	184.	0	0	0	7.	9700.	918.	335.	10954.	640.	309.
44	185.	0	0	0	7.	8155.	1308.	272.	9735.	633.	327.
45	186.	0	0	0	6.	7793.	1091.	273.	9157.	654.	283.
46	187.	0	0	0	4.	9245.	896.	263.	10404.	656.	260.
47	190.	0	0	0	3.	6381.	438.	193.	7012.	573.	455.
48	191.	0	0	0	3.	6191.	435.	187.	6813.	590.	420.
49	192.	0	0	0	3.	5835.	594.	177.	6606.	671.	268.
50	193.	0	0	0	3.	5232.	382.	155.	5769.	664.	263.
51	194.	0	0	0	4.	9713.	874.	272.	10858.	652.	262.

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	AS	WOOD	BL	NORANCES	GRASS	FORBS	SHRUBS	TOTAL	BGGAME	SMGAME
52	195.	0	0	0	5.	6589.	563.	270.	7422.	563.	230.
53	196.	0	0	0	5.	6270.	600.	251.	7121.	577.	225.
54	197.	0	0	0	7.	8598.	650.	294.	9541.	694.	226.
55	198.	0	0	0	6.	8550.	623.	359.	9533.	513.	301.
56	199.	0	0	0	4.	8948.	532.	408.	9889.	461.	305.
57	200.	0	0	0	5.	7988.	410.	324.	8722.	537.	302.
58	201.	0	0	0	4.	6034.	377.	289.	6700.	415.	298.
59	202.	0	0	0	5.	14349.	1109.	388.	15846.	542.	379.
60	203.	0	0	0	6.	6922.	634.	211.	7767.	648.	307.
61	205.	0	0	0	4.	15670.	1079.	419.	17167.	505.	431.
62	231.	0	0	0	5.	7380.	597.	210.	8187.	651.	265.
63	232.	0	0	0	2.	6901.	371.	210.	7482.	488.	599.
64	233.	0	0	0	3.	6060.	770.	188.	7017.	686.	230.
65	234.	0	0	0	4.	6175.	600.	180.	6954.	707.	208.
66	235.	0	0	0	5.	6124.	818.	314.	7256.	368.	335.
67	237.	0	0	0	3.	5505.	301.	163.	5969.	598.	367.
68	238.	0	0	0	3.	5469.	359.	162.	5990.	618.	330.
69	239.	0	0	0	4.	10519.	733.	292.	11544.	570.	410.
70	240.	0	0	0	3.	5561.	313.	164.	6038.	612.	364.
71	241.	0	0	0	3.	6301.	530.	192.	7023.	608.	391.
72	242.	0	0	0	5.	12514.	699.	339.	13552.	502.	441.
73	243.	0	0	0	4.	12824.	962.	344.	14129.	590.	251.
74	244.	0	0	0	3.	6[illegible]61.	446.	262.	7069.	451.	277.
75	245.	0	0	0	4.	6442.	270.	190.	6902.	538.	515.
76	246.	0	0	0	3.	7549.	702.	221.	8472.	673.	333.
77	247.	0	0	0	5.	5693.	549.	270.	6512.	387.	342.
78	249.	0	0	0	5.	6036.	600.	227.	6862.	515.	342.
79	250.	0	0	0	5.	6422.	576.	220.	7218.	571.	364.
80	253.	0	0	0	4.	7567.	462.	210.	8239.	657.	335.
81	254.	0	0	0	2.	7642.	392.	204.	8239.	678.	286.
82	255.	0	0	0	2.	6123.	462.	278.	6863.	402.	279.
83	256.	0	0	0	2.	6610.	453.	255.	7319.	495.	266.
84	257.	0	0	0	3.	5944.	436.	276.	6656.	373.	301.
85	258.	0	0	0	3.	6254.	543.	177.	6974.	719.	187.
86	259.	0	0	0	4.	6471.	593.	197.	7261.	617.	380.
87	260.	0	0	0	4.	6490.	496.	196.	7181.	594.	420.
88	261.	0	0	0	3.	16752.	972.	437.	18161.	481.	431.
89	262.	0	0	0	4.	18[illegible]71.	1149.	475.	19994.	504.	355.
90	263.	0	0	0	4.	10185.	629.	286.	11600.	580.	328.
91	264.	0	0	0	3.	11879.	608.	316.	12803.	523.	422.
92	265.	0	0	0	4.	7106.	399.	200.	7705.	611.	346.
93	267.	1.	0	0	5.	7328.	879.	228.	8436.	674.	305.
94	269.	0	0	1.	7.	5521.	498.	177.	6196.	575.	210.
95	270.	5.	0	5.	8.	5134.	451.	190.	5775.	460.	236.
96	271.	0	0	0	4.	5494.	504.	194.	6192.	603.	269.
97	272.	0	0	0	2.	5384.	481.	317.	6181.	255.	303.
98	273.	0	0	0	2.	5362.	481.	318.	6161.	251.	303.
99	274.	0	0	0	2.	6743.	450.	249.	7443.	521.	262.
100	276.	14.	0	7.	6.	12846.	1281.	532.	14659.	569.	271.
101	277.	15.	0	1.	6.	10426.	1080.	416.	11923.	619.	295.
102	278.	7.	0	1.	6.	10948.	1178.	422.	12548.	673.	263.

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	AS	WOOD	BL	NORANGES	GRASS	FORBS	SHRUBS	TOTAL	BGGAME	SMGAME
103	279.	5.	0	7.	5.	13257.	1369.	533.	15160.	609.	233.
104	280.	28.	0	4.	5.	10579.	990.	455.	12023.	533.	326.
105	281.	0	0	1.	4.	10093.	1135.	371.	11598.	698.	224.
106	282.	1.	0	1.	5.	12089.	1319.	462.	13871.	687.	235.
107	283.	28.	0	0	5.	4346.	329.	200.	4876.	466.	308.
108	284.	14.	0	7.	7.	5297.	390.	216.	5902.	416.	264.
109	285.	1.	0	1.	7.	5134.	492.	181.	5807.	539.	215.
110	286.	7.	0	5.	6.	5551.	480.	234.	6264.	359.	251.
111	287.	0	0	0	2.	4621.	86.	171.	4878.	242.	484.
112	288.	0	0	0	2.	6123.	462.	278.	6863.	402.	279.
113	289.	0	0	0	2.	6987.	446.	238.	7671.	567.	255.
114	290.	0	0	0	2.	7164.	442.	230.	7837.	601.	251.
115	291.	0	0	0	2.	6632.	453.	254.	7339.	500.	265.
116	292.	0	0	0	2.	7054.	445.	235.	7733.	580.	254.
117	293.	0	0	0	2.	7239.	450.	235.	7924.	603.	255.
118	294.	0	0	0	2.	6100.	463.	279.	6842.	398.	280.
119	295.	0	0	0	2.	5945.	466.	286.	6697.	368.	284.
120	297.	32.	0	0	4.	13256.	752.	445.	14453.	326.	497.
121	298.	43.	0	0	2.	4202.	217.	285.	4705.	288.	401.
122	299.	59.	0	0	3.	3643.	62.	207.	3912.	487.	354.
123	300.	65.	0	0	3.	4418.	15.	241.	4675.	392.	522.
124	301.	64.	0	13.	4.	3183.	14.	203.	3401.	336.	390.
125	302.	0	0	0	3.	5143.	410.	315.	5868.	198.	384.
126	303.	0	0	0	2.	5259.	374.	305.	5938.	208.	417.
127	304.	0	0	0	7.	9668.	663.	310.	10641.	648.	397.
128	305.	0	0	2.	6.	8631.	572.	268.	9471.	683.	262.
129	306.	20.	0	14.	8.	5191.	256.	186.	5632.	486.	243.
130	307.	9.	0	5.	8.	5952.	372.	210.	6534.	538.	233.
131	308.	0	0	0	5.	13717.	1139.	393.	15248.	600.	339.
132	309.	0	0	0	3.	8996.	909.	292.	10197.	687.	275.
133	311.	1.	0	0	6.	5254.	572.	166.	5992.	603.	209.
134	312.	0	.	0	5.	13646.	1460.	537.	15644.	670.	237.
135	313.	0	0	1.	4.	10920.	1209.	409.	12538.	692.	225.
136	314.	0	0	0	3.	8070.	942.	279.	9291.	706.	214.
137	315.	0	0	0	3.	5991.	683.	180.	6854.	712.	199.
138	316.	0	0	0	3.	7424.	531.	211.	8165.	642.	352.
139	317.	0	0	0	4.	10060.	843.	339.	11242.	705.	358.
140	318.	0	0	0	4.	8860.	876.	288.	10024.	699.	320.
141	319.	0	0	0	7.	10070.	570.	320.	10960.	680.	348.
142	320.	0	0	0	4.	8108.	541.	339.	8988.	565.	254.
143	321.	0	0	0	3.	9379.	850.	343.	10572.	638.	332.
144	322.	0	0	0	4.	9536.	763.	346.	10645.	672.	302.
145	324.	0	0	0	4.	7452.	435.	263.	8150.	739.	152.
146	325.	0	0	0	4.	8536.	563.	352.	9450.	587.	263.
147	326.	0	0	0	5.	9536.	717.	311.	10564.	713.	320.
148	327.	0	0	0	3.	6409.	793.	196.	7398.	690.	240.
149	328.	0	0	0	4.	7603.	590.	207.	8400.	702.	161.
150	329.	0	0	0	1.	6894.	0	204.	7098.	393.	785.
151	330.	0	0	0	3.	5591.	500.	168.	6259.	666.	271.

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	SITETYPE	SITEAREA	ELEV	HORWATER	VERWATER	SLOPE	OVERVW
1	6.	1.	9900.	2466.	0	0	3.	55.
2	47.	8.	429000.	2667.	2900.	140.	2.	360.
3	143.	3.	34600.	2530.	550.	22.	1.	360.
4	144.	3.	3300.	2835.	3100.	92.	1.	180.
5	146.	3.	1600.	2481.	3250.	0	5.	60.
6	147.	3.	2000.	2505.	3300.	19.	5.	130.
7	148.	4.	2490.	2518.	2550.	6.	1.	180.
8	149.	4.	1070.	2524.	350.	0	3.	90.
9	150.	3.	5280.	2536.	1950.	12.	2.	180.
10	151.	1.	2670.	2579.	3600.	64.	10.	300.
11	152.	1.	660.	2563.	3900.	45.	9.	155.
12	153.	1.	2380.	2512.	1050.	4.	7.	180.
13	154.	2.	70.	2518.	200.	7.	6.	165.
14	155.	3.	2380.	2542.	325.	27.	5.	360.
15	156.	2.	30.	2509.	400.	3.	6.	110.
16	157.	1.	790.	2505.	1275.	12.	9.	360.
17	158.	3.	290.	2493.	2050.	6.	1.	360.
18	159.	1.	420.	2493.	2500.	9.	0	325.
19	160.	1.	1320.	2490.	2750.	3.	0	235.
20	161.	1.	1290.	2504.	1500.	17.	4.	180.
21	162.	3.	1390.	2616.	3150.	19.	2.	230.
22	163.	3.	2240.	2557.	3400.	24.	0	310.
23	164.	3.	790.	2530.	1500.	6.	4.	75.
24	165.	1.	440.	2509.	1200.	15.	2.	20.
25	166.	4.	79200.	2530.	40.	6.	5.	40.
26	167.	4.	6340.	2524.	750.	0	1.	60.
27	168.	3.	3040.	2524.	600.	0	2.	70.
28	169.	1.	550.	2524.	600.	0	2.	80.
29	170.	3.	990.	2530.	450.	6.	5.	60.
30	171.	1.	460.	2545.	500.	21.	0	210.
31	172.	1.	3220.	2460.	1950.	40.	1.	45.
32	173.	3.	840.	2530.	950.	6.	2.	140.
33	174.	1.	330.	2536.	1500.	12.	1.	145.
34	175.	3.	10560.	2527.	1500.	3.	4.	60.
35	176.	1.	290.	2509.	2000.	15.	4.	150.
36	177.	4.	21040.	2505.	1700.	19.	2.	80.
37	178.	3.	6730.	2521.	1500.	3.	5.	170.
38	179.	1.	1660.	2585.	4000.	12.	16.	115.
39	180.	1.	2540.	2610.	3500.	13.	2.	270.
40	181.	1.	1850.	2530.	1150.	33.	1.	180.
41	182.	8.	118800.	2560.	900.	64.	1.	325.
42	183.	2.	9900.	2579.	1300.	83.	1.	360.
43	184.	1.	9110.	2582.	1500.	86.	0	360.
44	185.	1.	2790.	2518.	800.	20.	0	185.
45	186.	4.	3960.	2542.	1100.	44.	8.	160.
46	187.	2.	920.	2560.	4000.	56.	6.	275.
47	190.	1.	980.	2490.	2400.	12.	0	190.
48	191.	1.	13870.	2490.	2250.	12.	0	220.
49	192.	1.	3200.	2512.	2100.	34.	0	360.
50	193.	3.	5220.	2502.	1500.	13.	4.	150.
51	194.	1.	6530.	2557.	4000.	42.	0	245.

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	SITETYPE	SITEAREA	ELEV	HORWATER	VERWATER	SLOPE	OVERVW
52	195.	3.	4770.	2563.	950.	39.	0	205.
53	196.	1.	650.	2554.	850.	30.	2.	110.
54	197.	1.	1060.	2536.	800.	12.	0	180.
55	198.	1.	2410.	2505.	950.	39.	2.	280.
56	199.	1.	5820.	2499.	600.	33.	0	230.
57	200.	1.	3520.	2496.	2150.	30.	0	240.
58	201.	3.	3960.	2505.	2250.	39.	1.	360.
59	202.	3.	9900.	2515.	375.	25.	4.	170.
60	203.	1.	3480.	2531.	750.	41.	4.	200.
61	205.	3.	3170.	2478.	850.	0	0	150.
62	231.	3.	3300.	2536.	900.	24.	0	360.
63	232.	1.	100.	2499.	2600.	19.	1.	210.
64	233.	1.	400.	2512.	1450.	29.	6.	300.
65	234.	1.	1750.	2542.	2500.	12.	2.	260.
66	235.	2.	70.	2518.	2100.	37.	3.	240.
67	237.	1.	500.	2499.	1000.	13.	2.	160.
68	238.	4.	10000.	2505.	1050.	24.	6.	180.
69	239.	1.	330.	2487.	1100.	6.	1.	60.
70	240.	3.	1200.	2493.	1200.	6.	3.	90.
71	241.	2.	1000.	2493.	2150.	6.	3.	180.
72	242.	4.	2000.	2472.	200.	9.	2.	270.
73	243.	3.	1000.	2499.	250.	37.	10.	360.
74	244.	1.	500.	2496.	400.	21.	7.	240.
75	245.	3.	15840.	2520.	2250.	21.	7.	250.
76	246.	2.	450.	2484.	1350.	0	20.	210.
77	247.	2.	570.	2473.	950.	8.	7.	220.
78	24[illegible].	2.	3600.	2474.	800.	7.	10.	55.
79	250.	1.	710.	2478.	800.	3.	10.	100.
80	253.	1.	820.	2490.	650.	6.	1.	65.
81	254.	4.	13200.	2505.	650.	14.	15.	360.
82	255.	3.	2800.	2502.	1000.	34.	9.	80.
83	256.	1.	720.	2514.	600.	40.	5.	180.
84	257.	4.	7000.	2484.	350.	10.	7.	140.
85	258.	1.	2000.	2542.	1850.	12.	1.	360.
86	259.	3.	2400.	2508.	2600.	22.	2.	220.
87	260.	1.	150.	2508.	2650.	22.	4.	190.
88	261.	3.	40000.	2499.	200.	18.	10.	180.
89	262.	4.	20000.	2499.	200.	21.	7.	180.
90	263.	2.	9000.	2499.	450.	21.	5.	215.
91	264.	4.	1980.	2502.	400.	18.	4.	180.
92	265.	4.	15000.	2505.	600.	24.	6.	270.
93	267.	3.	4500.	2554.	2200.	61.	2.	235.
94	269.	1.	80.	2551.	2550.	58.	1.	90.
95	270.	3.	28000.	2560.	2500.	67.	2.	180.
96	271.	1.	1000.	2487.	350.	25.	2.	120.
97	272.	1.	3000.	2481.	1100.	17.	1.	190.
98	273.	4.	15000.	2487.	1200.	22.	2.	250.
99	274.	4.	10610.	2530.	600.	61.	1.	360.
100	276.	4.	12000.	2518.	1500.	91.	1.	180.
101	277.	2.	1400.	2512.	1750.	97.	1.	150.
102	278.	2.	600.	2518.	1800.	91.	2.	50.

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	SITETYPE	SITEAREA	ELEV	HORWATER	VERWATER	SLOPE	OVERVW
103	279.	4.	2700.	2518.	1550.	91.	2.	45.
104	280.	4.	3000.	2502.	1500.	107.	1.	75.
105	281.	1.	2200.	2530.	1900.	79.	4.	90.
106	282.	1.	600.	2518.	1750.	91.	1.	90.
107	283.	1.	600.	2512.	2000.	97.	2.	180.
108	284.	2.	600.	2542.	2600.	58.	2.	140.
109	285.	1.	1100.	2548.	2650.	55.	1.	90.
110	286.	2.	8000.	2524.	2400.	85.	1.	100.
111	287.	3.	100.	2487.	1000.	12.	1.	270.
112	288.	3.	560.	2496.	1000.	22.	2.	90.
113	289.	2.	670.	2508.	700.	34.	7.	115.
114	290.	1.	800.	2498.	600.	24.	10.	90.
115	291.	1.	11000.	2508.	600.	34.	7.	85.
116	292.	1.	2000.	2514.	550.	45.	10.	270.
117	293.	1.	3650.	2514.	500.	40.	5.	360.
118	294.	2.	1980.	2493.	900.	21.	6.	100.
119	295.	4.	31980.	2499.	600.	24.	6.	180.
120	297.	4.	7290.	2484.	75.	3.	3.	360.
121	298.	1.	790.	2492.	650.	14.	8.	125.
122	299.	4.	2520.	2505.	1400.	24.	1.	160.
123	300.	1.	3340.	2493.	1400.	9.	7.	180.
124	301.	4.	10300.	2530.	2000.	52.	4.	230.
125	302.	4.	10000.	2487.	1200.	12.	1.	300.
126	303.	1.	530.	2518.	1500.	34.	1.	200.
127	304.	4.	44020.	2487.	0	0	8.	35.
128	305.	3.	4600.	2560.	2300.	73.	0	360.
129	306.	1.	7500.	2563.	2600.	82.	1.	180.
130	307.	2.	3000.	2560.	2550.	67.	1.	360.
131	308.	3.	22000.	2512.	200.	19.	1.	180.
132	309.	1.	200.	2524.	850.	31.	4.	180.
133	311.	7.	36000.	2560.	2500.	49.	1.	360.
134	312.	8.	10000.	2550.	1750.	59.	1.	220.
135	313.	1.	2600.	2542.	1900.	67.	3.	120.
136	314.	2.	3500.	2548.	2200.	61.	1.	180.
137	315.	6.	8000.	2579.	2400.	30.	2.	360.
138	316.	4.	19010.	2493.	800.	18.	2.	60.
139	317.	4.	800.	2490.	150.	0	1.	45.
140	318.	5.	400.	2505.	440.	19.	2.	220.
141	319.	2.	6860.	2486.	150.	2.	1.	25.
142	320.	4.	56000.	2493.	1500.	12.	2.	90.
143	321.	2.	25000.	2539.	1700.	58.	2.	360.
144	322.	4.	24000.	2530.	2000.	37.	6.	360.
145	324.	1.	150.	2502.	650.	21.	0	190.
146	325.	2.	1340.	2502.	1150.	21.	5.	160.
147	326.	6.	40.	2531.	500.	47.	5.	280.
148	327.	2.	450.	2496.	2000.	8.	15.	180.
149	328.	1.	26400.	2530.	650.	22.	0	360.
150	329.	1.	130.	2495.	2150.	9.	1.	360.
151	330.	1.	410.	2515.	1500.	3.	20.	90.

Appendix D.

DESCRIPTION OF THE TESTING OF 5JA262 AND 5JA276

Test Pit 1, 5JA262

This was a 1 meter by 2 meter test pit with the long axis running east-west (relative to true north). The test pit datum was established at ground surface at the northwest corner, which was located 66 meters north and 16 meters east of the site datum. The ground surface was 60.5 cm. below datum at the northwest corner, 62 cm. at the southeast corner and 6.3 cm. at the southwest corner (cf. Figure D-1). Charcoal flecks were eroding out of the side of a cutbank in the southeast corner of the test pit. The test pit was excavated using shovel and trowel and all excavated material was passed through a 1/4" screen. When using the shovel, the soil was shaved off so that features or artifacts could be detected as soon as they appeared. As the level of the hearth was approached, only the trowel was used.

The first 53 cm. below datum (BD) was execavated in arbitrary levels. Level 1 was excavated to 20 cm. BD, level 2 was excavated from 20 cm. to 33 cm. BD, level 3 was excavated from 33 cm. to 43 cm. BD and level 4 was excavated from 43 cm. to 53 cm. BD. The levels were not excavated to conform to the contours of the surface but on the level into the hillside. Consequently, the bottom of each level intersected the present ground surface at increasingly greater distances from the west side of the test pit.

Levels 1 through 3 were devoid of any cultural material. At the bottom of level 4, three small blocks of sandstone surrounded by char-coal-stained soil were found in the northwest corner of the test pit near present ground surface (cf. Figure D-2). Three soil zones (labelled

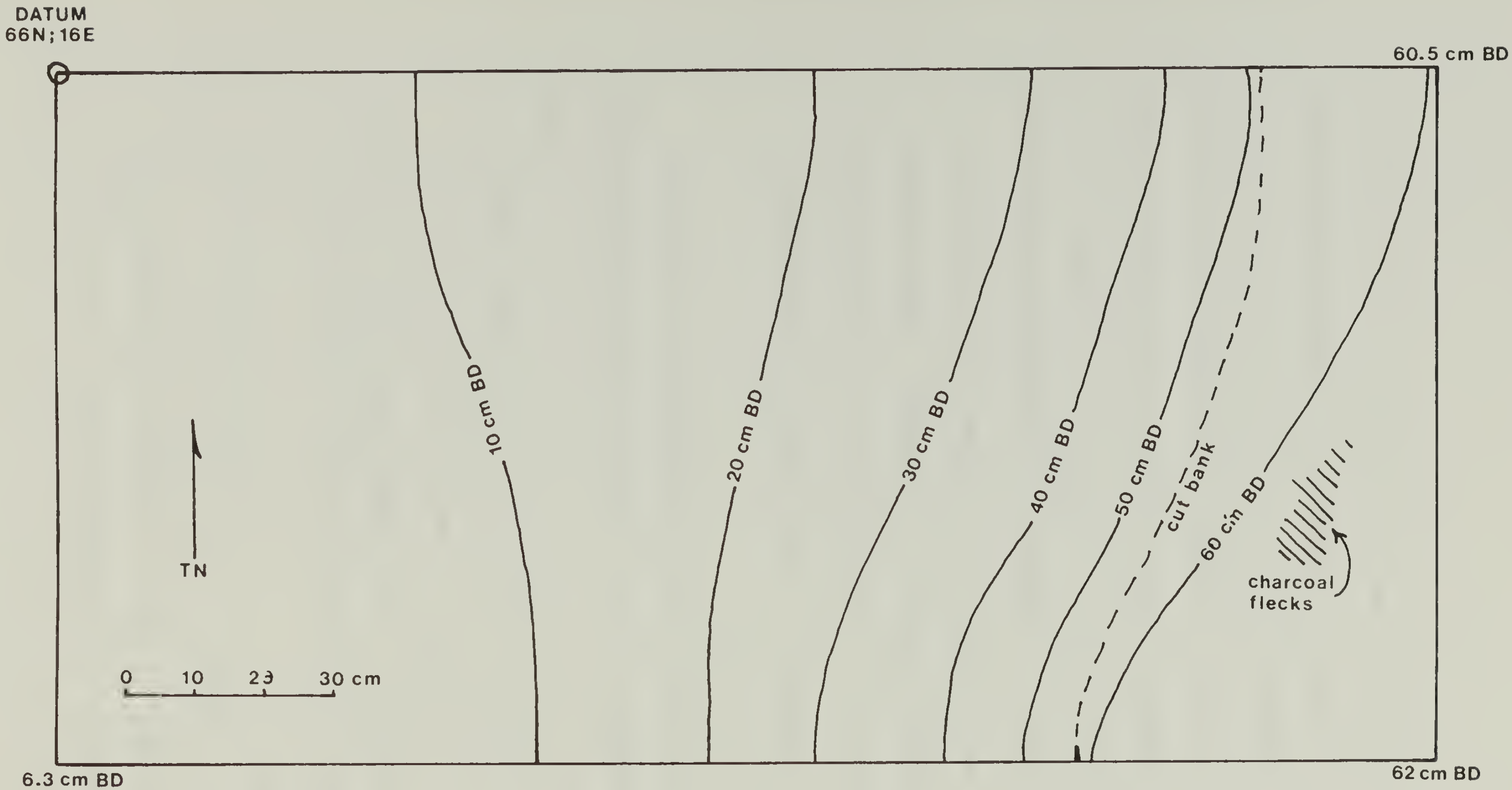


Figure D-1. Ground surface of Test Pit 1 at Site 5JA262.

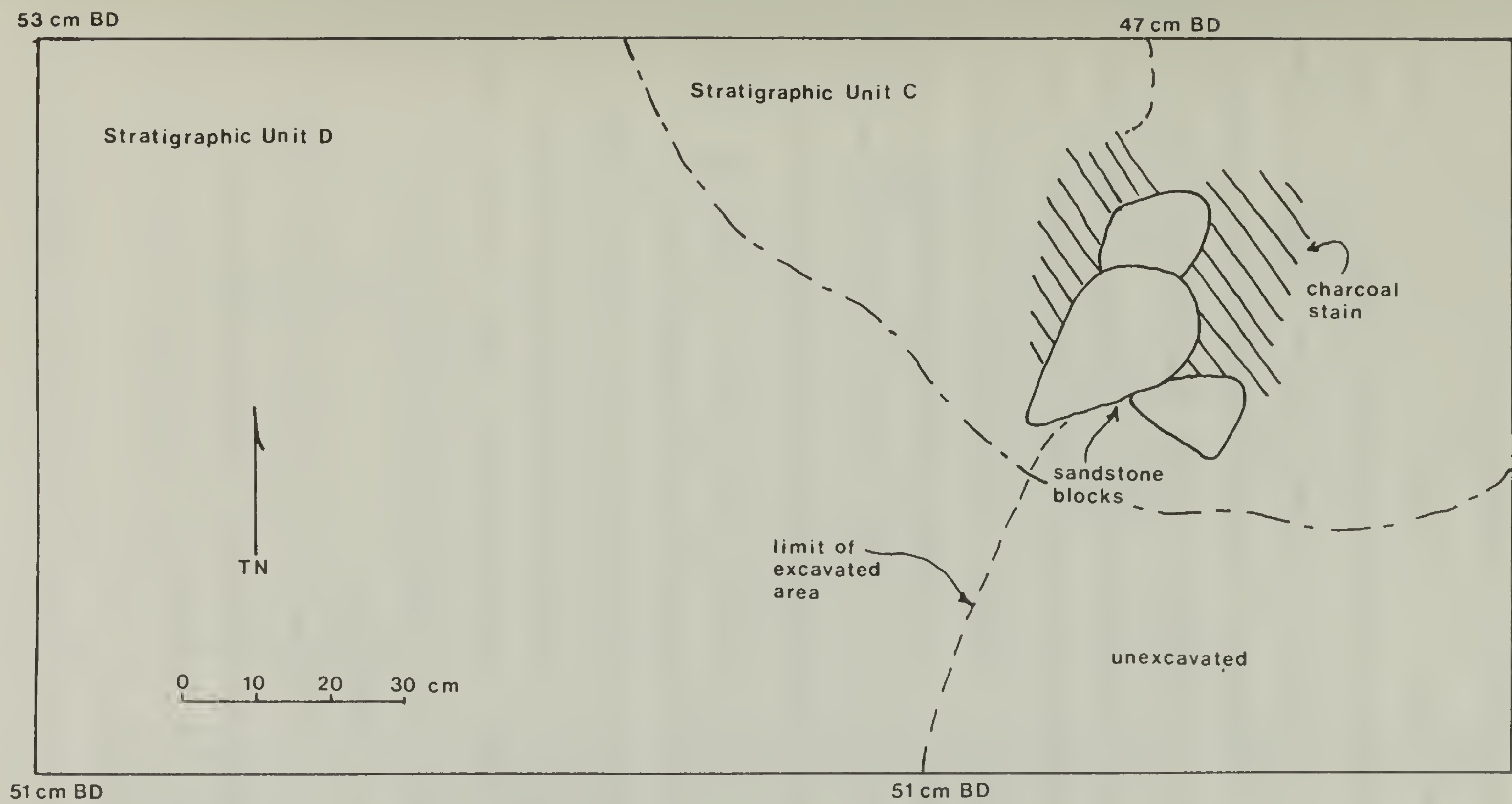


Figure D-2. Plan view of bottom of Level 4, Test Pit 1, Site 5JA262 (charcoal stain and sandstone blocks are Feature 1).

Stratigraphic Units A, B and D) were distinguishable at this level.

The three sandstone blocks and associated stained soil were labelled Feature 1. The feature was excavated as a unit and designated level 5. It extended from 52 cm. to 66 cm. BD (cf. Figure D-3). Two soil samples, one pollen sample and a carbon sample were taken from the hearth contents, which consisted of a black-stained soil with numerous pieces of charcoal in it. A fragment of burned bone was also found in the hearth. The hearth fill was overlain by six sandstone blocks, two of which were fire-blackened and the other four slightly blackened and oxidized on the undersides. It appears that the stones were pushed on top of the fire to smother it. The hearth measured approximately 72 cm. (E-W) by 64 cm (N-S) and attained a maximum thickness of 5 cm. The wall of the firepit was not well defined and part of the charcoal distribution may have occurred after the hearth was used. No flakes or stone artifacts were found either in the hearth or associated with it.

Level 6 was excavated to a depth of 70 cm. BD in the area immediately below Feature 1 and ws limited in extent to the distribution of Stratigraphic Unit C. Level 7 was excavated to a depth of 64 cm. BD in the remainder of the test pit to investigate the nature of the stratigraphic units (cf. Figure D-4).

The stratigraphic units defined by the excavators are described below and their relationships to Feature 1 are shown in profile in Figure D-5. Feature 1 was located between Stratigraphic Units A and C at the east end of the test pit.

Stratigraphic Unit A is identified as an A horizon divided into 2

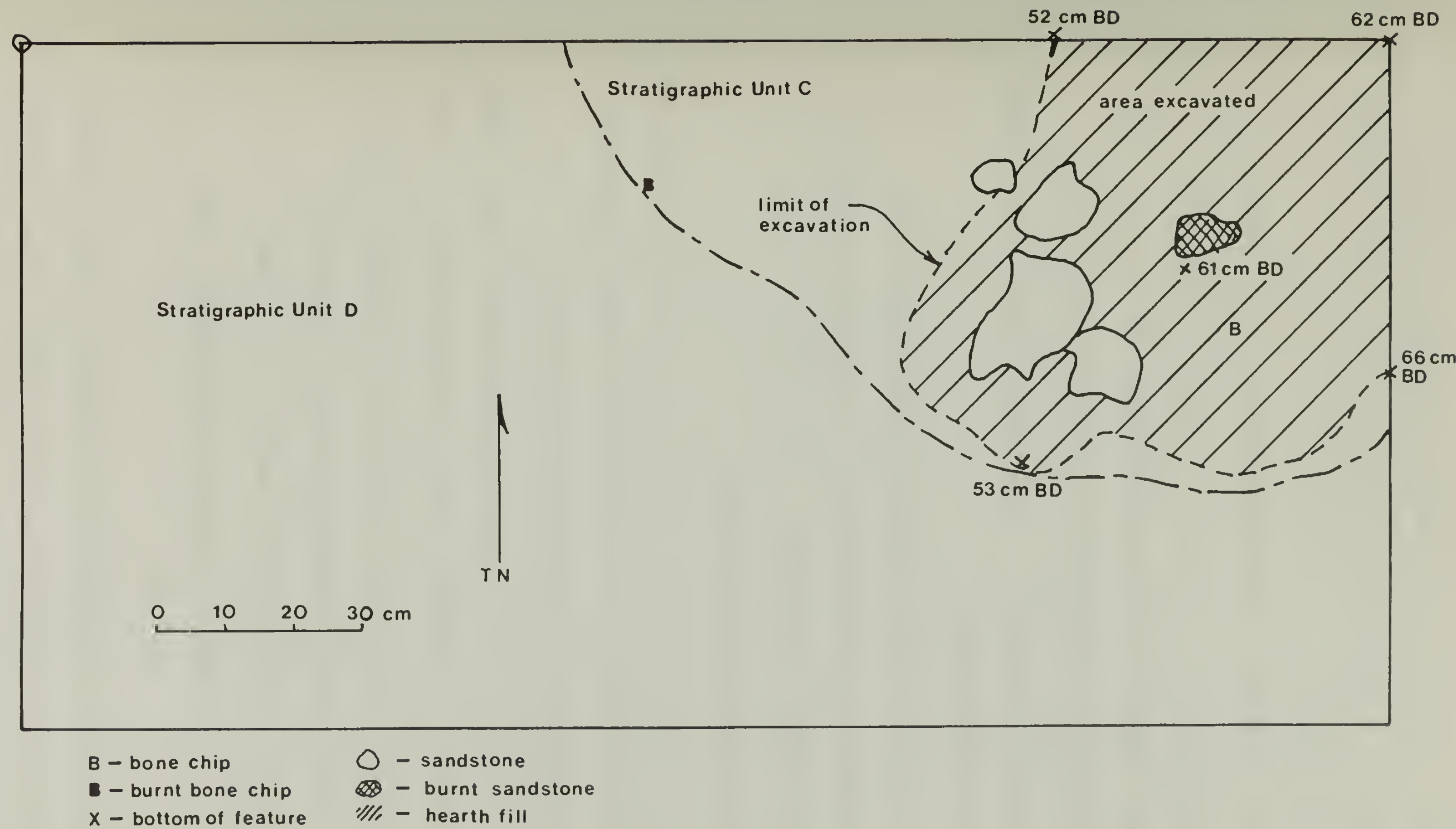


Figure D-3. Level 5 (Feature 1) in Test Pit 1, Site 5JA262.

sub-units, A-1 and A-2. Unit A-1 is a loose sandy brown soil held together by grass roots. Unit A-2 is a yellowish-brown sandy loam with some evidence of rodent activity. A B horizon could not be distinguished from the A horizon. Stratigraphic Unit B is defined as Feature 1. Stratigraphic Unit C consists of a water-lain deposit of sand mixed with a small amount of yellow-brown loam and it fills a dip just to the west of Feature 1 that appears to have been part of an erosional sequence predating Feature 1. Stratigraphic Unit D is defined as a C horizon of deteriorated shale.

Half of each of the three soil samples was submitted to the Laboratory of Ethnobotany of the University of Colorado for flotation and identification of organic constituents. Bruce Benz performed the analysis and his results are summarized below.

Sample 1, obtained from the hearth contents at 52 cm. BD, contained numerous unidentified insect parts, two uncarbonized seeds tentatively identified as Chenopodiaceae and a single unidentified seed.

Sample 2, 57.7 cm. BD, contained numerous unidentified insect parts and seven unidentified and uncarbonized seeds and seed fragments. One other uncarbonized seed was tentatively identified as <u>Eleocharis</u> sp. of the Cyperaceae family and another uncarbonized seed fragment was tentatively identified sa representing the family Polyconaceae.

Sample 3, 58.5 cm. BD, contained only one uncarbonized and unidentifiable seed.

The fact that these seeds are uncarbonized indicates that they got into the hearth contents after the fire was extinguished. Some rodent activity was found in the test pit and it is possible that the seeds do

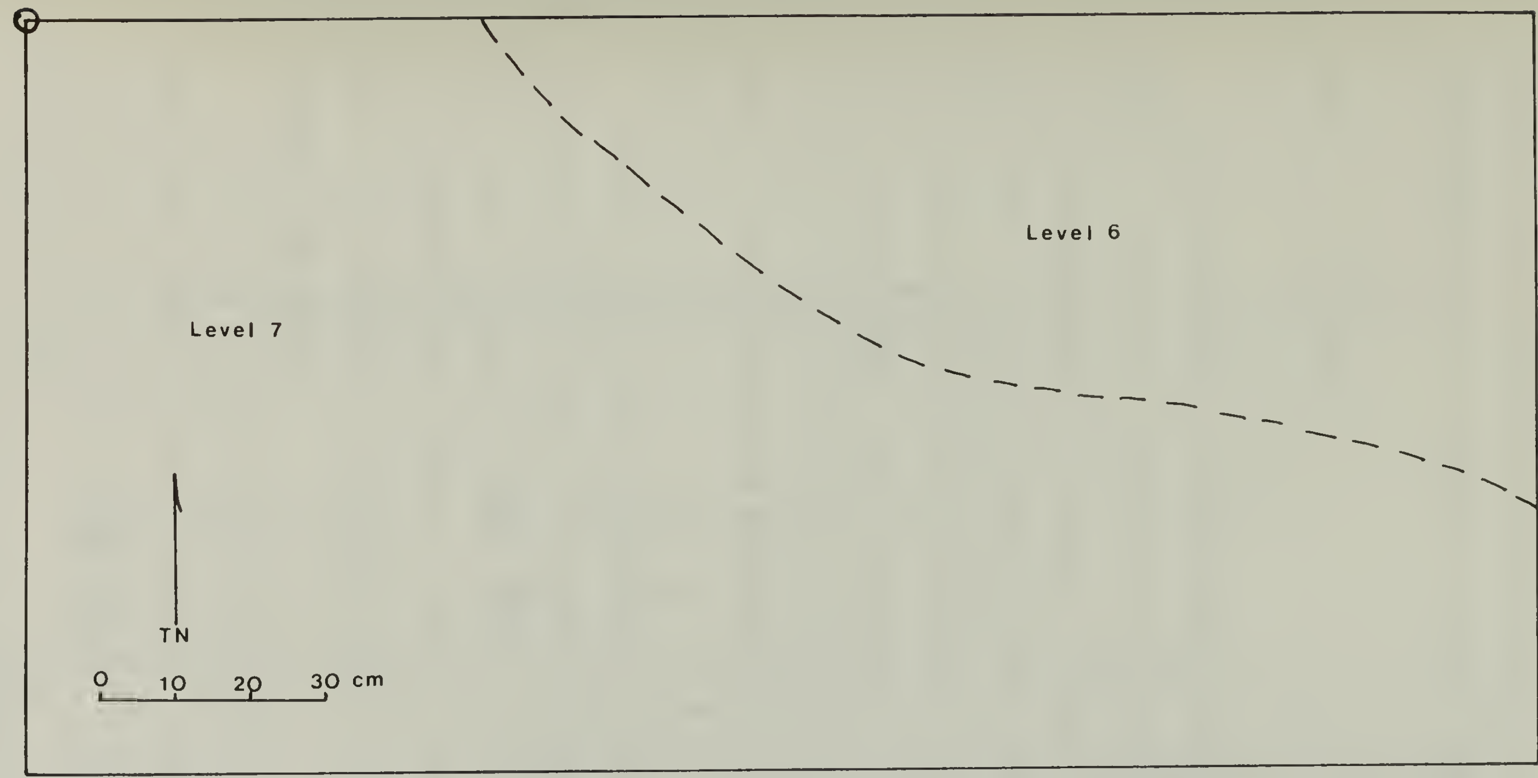


Figure D-4. Plan view of bottom of levels 6 and 7, Test Pit 1, Site 5JA262.

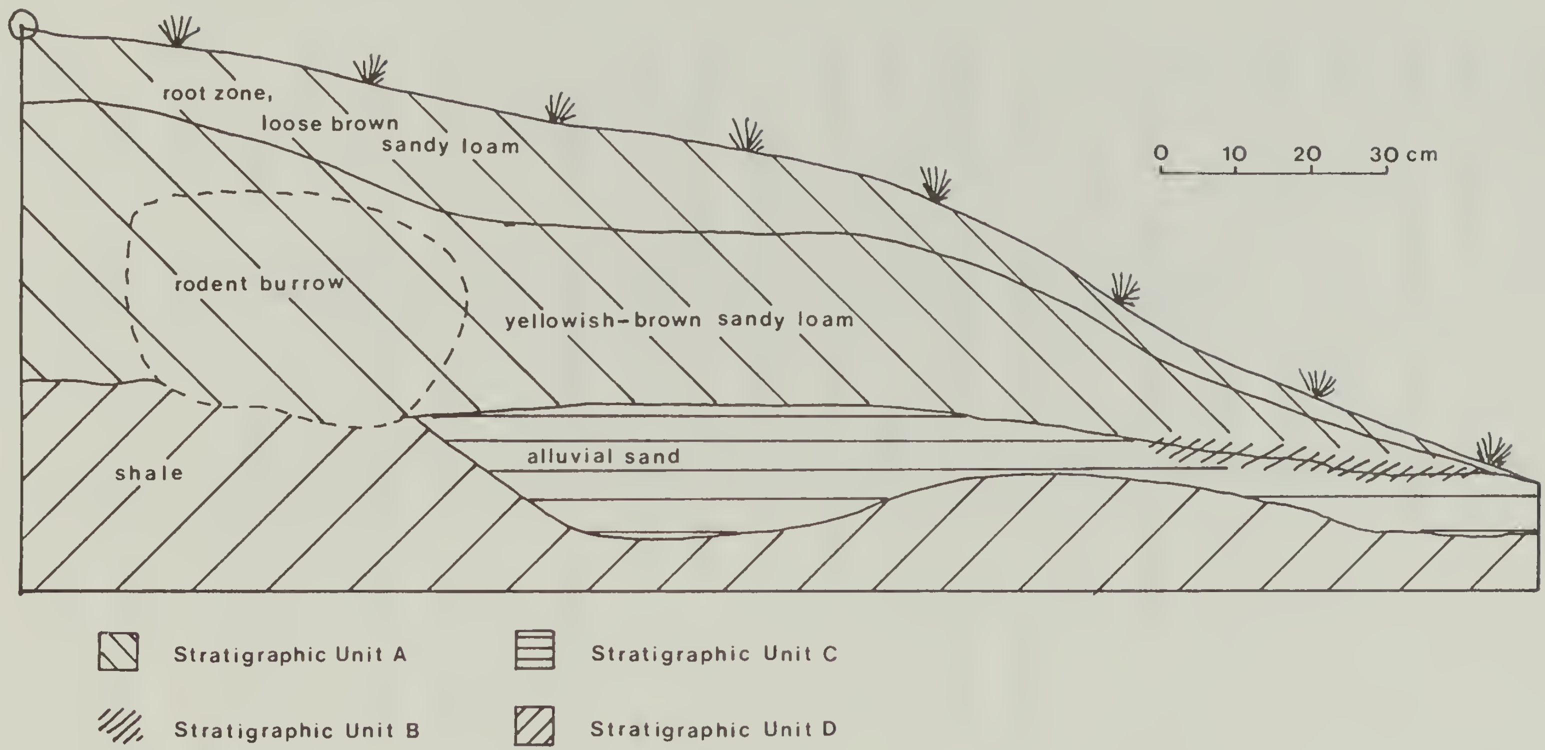


Figure D-5. Profile of north side of Test Pit 1, Site 5JA262. Feature 1 is Stratigraphic Unit B at interface between Stratigraphic Units A and C.

not represent cultural activity. The carbonized wood samples found in the hearth were tentatively identified as either Rabbitbrush (*Chrysothamnus* sp.) or sagebrush (*Artemisia* sp.).

Test Pit 2, Site 5JA262

The concentration of sherds found near Test Pit 1 was labelled Feature 2. Test Pit 2, measuring 1 meter by 2 meters, was laid out in the concentration with its long axis oriented north-south (relative to true north). The test pit datum was established at ground surface at the northwest corner, which was located 66 meters north and 12 meters east of the site datum. The distribution of surface materials is shown in Figure D-6 in relation to the test pit. The entire test pit was excavated to 10 cm. BD and the north half of the test pit was excavated to 40 cm. BD.

Level 1 was a surface scrape down to 1 to 3 cm. below the surface. A total of 41 body sherds, 1 rim sherd, 4 bone fragments and 10 flakes were recovered from this level. They were all recovered from the screen and consequently their locations within the test pit could not be determined. The excavators note, however, that the material was scattered throughout the square.

Level 2 was excavated as a natural level following the contours of the ground surface. It was excavated to a depth of 3-5 cm. below the surface by trowel. Three sherds and 2 small quartzite flakes were recovered from the level.

Level 3 was an arbitrary level excavated to a depth of 10 cm. BD.

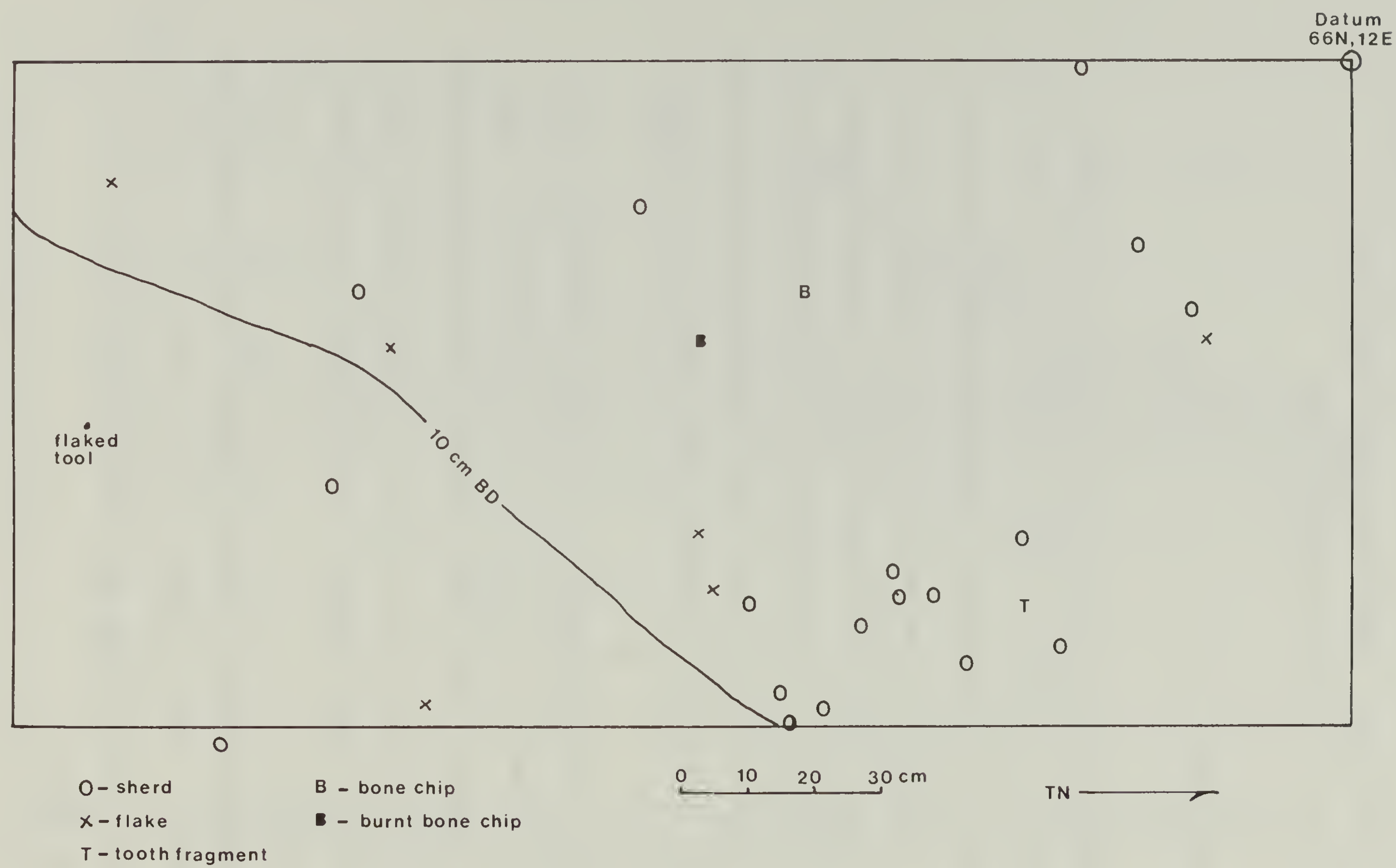


Figure D-6. Ground surface of Test Pit 2, Site 5JA262.

No cultural materials were found in this level.

Levels 4 through 7 were excavated only in the north half of the test pit. Level 4 was excavated from 10 to 20 cm. BD, level 5 was excavated from 20 to 27 cm. BD, level 6 was excavated from 27 to 36 cm. BD and level 7 was excavated from 36 to 40 cm. BD. All levels were devoid of any cultural material.

Four stratigraphic units were defined and the relationships between them are shown in Figure D-7.

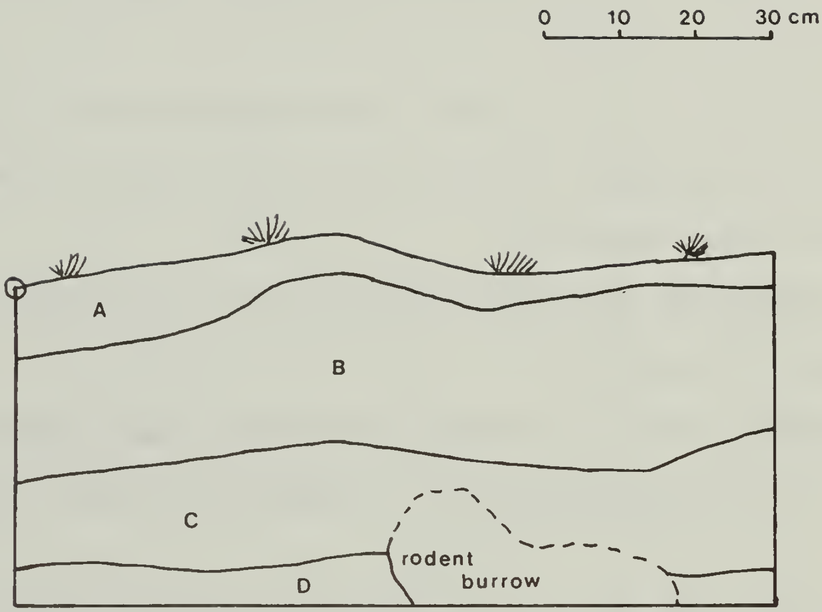
Stratigraphic Unit A is a light yellowish-brown sandy loam that is relatively loose and uncompacted. It is identified as the A-1 soil horizon.

Stratigraphic Unit B is a yellowish-brown sandy clay loam similar in nature to Unit A but more compacted. It is identified as the A-2 soil horizon.

Stratigraphic Unit C is a dark yellowish-brown sandy clay identified as the B soil horizon.

Stratigraphic Unit D is the C soil horizon and consists of fractured green shale mixed with a brown sand.

As noted, all cultural materials were found either on the surface or within 5 cm. of the surface. All sherds were small, rounded and quite eroded, indicating that all had been exposed to the elements for some time. Consequently, it is felt that none of the cultural materials were in an undisturbed, primary context.



Stratigraphic Unit A - light yellowish-brown sandy loam: very loose, uncompacted aeolian deposit

Stratigraphic Unit B - yellowish-brown clayey sand

Stratigraphic Unit C - dark yellowish-brown sandy clay

Stratigraphic Unit D - fractured shale substrate, pieces of green shale mixed with brown sandy matrix

Figure D-7. Profile of north side of Test Pit 2, Site 5JA262.

Test Pit, 1 Site 5JA276

This was a limited 1 x 1 meter excavation designed to remove an exposed row of teeth presumed to be bison and to determine the cultural significance of an associated area of scattered tooth enamel and bone fragments. The tooth row was located 25 meters from the main site datum on an azimuth of 207° from true north.

Excavation of the square to 5 cm. below the present ground surface confirmed that the bone and tooth scatter was limited to the present ground surface and did not derive from a subsurface deposit. Examination of the tooth and bone fragments by a vertebrae paleontologist at the University of Colorado proved inconclusive. The fragments could be from either a bison or a cow.

Apppendix E.

LITHIC ANALYSIS CODE LIST

Var.	Description	Column
1	Temporary Site Number (NP#)	1-3
	a) collection area (A,B,C,D,G)	4
2	Permanent Site Number (5JA)	5-7
3	Artifact Number (eg. NP1-__)	9-11
4	Material Type	13-14
	01 chert	
	02 chalcedony	
	03 petrified wood	
	04 basalt	
	05 quartz	
	06 quartzite	
	07 argillite	
	08 siltstone	
	09 jasper	
	10 obsidian	
	11 ignimbrite	
	12 sandstone	
	13 shale	
	14 slate	
	15 rhyolite	
	16 oolite	
	17 chert and chalcedony	
5	Material Appearance (1)	15
	1 banded/mottled	
	2 dendritic	
	3 solid	
6	Material Appearance (2) (only petrified wood)	16
	1 translucent	
	2 opaque	
7	Material Color	17-18
	01 red	
	02 white	
	03 black	
	04 grey	
	05 brown	
	06 gold/ochre	
	07 white/brown	
	08 tan	
	09 purple	
	10 brown/green	
	11 red/grey	
	12 pink	
	13 orange	
	14 red/brown	
	15 red/black	
	16 black/grey	
	17 green	
	18 yellow	
	19 brown/grey	
	20 gold/ochre/red	
	21 white/pink	
	22 grey/white	
	23 red/white	
	24 pink/brown	
	25 purple/pink	
8	Condition	20
	1 complete	
	2 proximal fragment	
	3 broken	
9	Platform	21
	1 grinding	
	2 facetting	
	3 struck (not prepared)	
	4 grinding/lip present	
	5 facetting/lip present	
	6 struck/lip present	
	7 grinding/facet/lip	
	8 grinding/facet	
	9 undetermined	
10	Dorsal Cortex	22-22
	1 0%	
	2 1-25%	
	3 26-50%	
	4 51-75%	
	5 76-99%	
	6 100%	

Var.	Description	Column
11	Heat Alteration	23
	1 color change	
	2 crazing	
	3 potlidding	
	4 heat fracture	
	5 change in luster	
	6 color change, crazing, heat fracture	
	7 crazing, heat fracture	
	8 color change, crazing, potlidding	
	9 crazing, potlidding, heat fracture	
12	Size Grade	24
	1-6	
13	Dorsal Surface	25
	1 ridge present	
	2 ridge absent	
14	Dimensions	26-36
	1 length (26-29)	
	2 width (30-33)	
	3 thickness (34-36)	
15	# Retouched Edges	38
16	# Utilized Edges	39
17	Which Edge	40
18	Retouched Edge	41
	1 proximal	
	2 lateral	
	3 distal	
	4 undetermined	
	5 lateral/distal	
19	Utilized Edge	42
	1 proximal	
	2 lateral	
	3 distal	
	4 undetermined	
	5 lateral/distal	
20	Length of Retouched Edge	43-46
21	Length of Utilized Edge	47-50
22	Edge Angle (°)	51-53
23	Edge Shape	
	1 convex	
	2 concave	
	3 straight	
	4 wavy	
	5 pointed	
	6 serrated	
	7 irregular	
	8 convex/pointed	
	9 concave/convex	
24	Retouch	56
	1 dorsal	
	2 ventral	
	3 bifacial	
25	Utilization	57
	1 dorsal	
	2 ventral	
	3 bifacial	
	4 edge only	
26	Edge Wear	58-59
	01 crushing/rounding	
	02 step fractures	
	03 scalar flakes	
	04 impact fractures	
	05 facetting	
	06 crushing	
	07 polish	
	08 rounding	
	09 striations parallel to edge	
	10 striations perpendicular to edge	
	11 striations multidirectional	
	12 opalization	

Var.	Description	Column

13 scalar/rounding
14 step/scalar/rounding
15 step/rounding
16 polish,rounding/striations (perpendicular)
17 facetting/rounding
18 scalar/polish/rounding/striations
19 scalar/polish
20 step/polish/rounding
21 scalar/polish/rounding
22 scalar/step
23 polish/rounding
24 scalar/step/polish/rounding
25 burin snap
26
27 step/facetting
28 rounding/polish/opalization
29 scalar/facetting
30 facetting/polish/scalar

Var.	Description	Column
27	Dorsal Surface Wear	60-61

01 hinge/scalar/rounding polish
02 step fractures
03 scalar flakes
04 impact fracture
05 striations parallel to edge
06 striations perpendicular to edge
07 polish
08 even rounding
09 uneven rounding
10 opalization
11 scalar/step
12 scalar/uneven rounding
13 scalar/step/uneven rounding
14 step/scalar/even rounding
15 step/polish
16
17 step/scalar/hinge/uneven rounding
18 step/uneven rounding
19 scalar/hinge
20 scalar/hinge/step

Var.	Description	Column
28	Ventral Surface Wear	62-63

01 scalar/hinge
02 step fracture
03 scalar flakes
04 impact fracture
05 striations parallel to edge
07 polish
08 even rounding
09 uneven rounding
10 opalization
1 step/scalar
12 scalar/uneven rounding
13 scalar/polish/even rounding
14 scalar/step/uneven rounding
15 step/hinge
16 scalar/rounding
17 crushing/rounding

Var.	Description	Column
29	Functional Tool Category	64-65

01 cutting
02 scraping
03 drilling
04 graver
05 haft margin
06 burination - unknown function
07 sawing
08 retouched/undetermined function
09 spoke shave

Var.	Description	Column
30	Transverse Cross-Section	67-68

01 plano-convex
02 lenticular
03 triangular
04 irregular
05 rhomboidal
06 biconvex
07 trapezoid
08 biplanar
09 plano triangular
10 convexo triangular
11 rectangular

Var.	Description	Column
31	Programmer	72

1 Miller
2 Joyner
3 McGuire

Var.	Description	Column	Var.	Description	Column
32	Artifact Category	76-77			
	01 nonutilized flake				
	02 utilized flake				
	08 patterned end scraper				
	09 utilized flake-notched haft element				
	10 possible preform				
33	Artifact Sequence # (utilized flake - tool edge sequence #)	78-80			

North Park Lithic Analysis Code List — CORE-CORE TOOL FORM
Page 1

Var.	Description	Column	Var.	Description	Column
1	Temporary Site Number (NP#)	1-3	9	Cortex Remaining	21
				1 0%	
2	Permanent Site Number (5JA)	5-7		2 1-25%	
3	Artifact Number (eg. NP1-__)	9-11		3 26-50%	
				4 51-75%	
4	Material Type	13-14		5 76%	
	01 chert		10	Blank Type	22
	02 chalcedony				
	03 petrified wood			1 river cobble (alluvial)	
	04 basalt			2 colluvial cobble (lag pebble)	
	05 quartz			3 flake core	
	06 quartzite			4 no cortex	
	07 argillite			5 undetermined (cortex present)	
	08 siltstone				
	09 jasper		11	Utilized	23
	10 obsidian				
	11 ignimbrite			1 yes	
	12 sandstone			2 no	
	13 shale				
	14 slate		12	Exhausted	24
	15 rhyolite				
				1 yes	
5	Material Appearance (1)	15		2 no	
	1 banded/mottled		13	# Utilized Edges	25
	2 dendritic				
	3 solid		14	Which Edge	26
6	Material Appearance (2)	16	15	Edge Wear/Alteration	27-28
	1 translucent			01 burination	
	2 opaque			02 proximal impact	
				03 distal impact	
7	Material Color	17-18		04 proximal and distal impact	
				05 lateral impact	
	01 red			06 polish/rounding	
	02 white			07 step fractures	
	03 black			08 scalar flakes	
	04 grey			09 facetting	
	05 brown			10 crushing	
	06 gold/ochre			11 polish	
	07 red/brown			12 rounding	
	08 pink/white			13 striations parallel to edge	
				14 striations perpendicular to edge	
8	# of Flake Scars (Minimum Number)	19-20		15 striations multidirectional	

Var.	Description	Column
	16 opalization	
	17 battering	
	18 step/scalar/polish/rounding	
	19 crushing/polish	
	20 polish/rounding/facetting	
16	Surface Wear/Alteration	29
	1 unifacial	
	2 bifacial	
17	Surface 1 Wear Alteration	30-31
	01 burination	
	02 proximal impact	
	03 distal impact	
	04 proximal and distal impact	
	05 lateral impact	
	06	
	07 step fractures	
	08 scalar flakes	
	09 striations parallel to edge	
	10 striations perpendicular to edge	
	11 striations multidirectional	
	12 polish	
	13 even rounding	
	14 uneven rounding	
	15 opalization	
	16 step/scalar	
	17 step/scalar/even rounding	
	18 percussion flake removal	
18	Surface 2 Wear/Alteration	32-33
	01 burination	
	02 proximal impact	
	03 distal impact	
	04 proximal and distal impact	
	05 lateral impact	
	06	
	07 step fractures	
	08 scalar flakes	
	09 striations parallel to edge	
	10 striations perpendicular to edge	
	11 striations multidirectional	
	12 polish	
	13 even rounding	
	14 uneven rounding	
	15 opalization	
	16 step/scalar	
	17 step/scalar/even rounding	
	18 percussion flake removal	
19	Degree of Wear	34
	1 minimal	
	2 moderate	
	3 heavy	
20	Dimensions (max. dimensions)	36-47
	1 length (36-39)	
	2 width (40-43)	
	3 thickness (44-47)	
21	Core Flake Scar Morphology	49
	1 prepared platform remnants	
	2 unidirectional	
	3 bidirectional	
	4 multidirectional	
	5 prepared platform remnants, unidirectional	
22	Functional Tool Category (other than core)	50
	1 chopper	
	2 hammerstone	
	3 scraping	
	4 cutting	
	5 undetermined	
23	Programmer	72
	1 Miller	
	2 Joyner	
	3 McGuire	
24	Core-Core Tools (05)	76-77
25	Artifact Sequence #	78-80

North Park Lithic Analysis Code List

HAMMERSTONE FORM
Page 1

Var.	Description	Column
1	Temporary Site Number (NP#)	1-3
2	Permanent Site Number (5JA)	5-7
3	Artifact Number (eg. NP1-__)	9-11
4	Material Type	13-14
	01 chert	
	02 chalcedony	
	03 petrified wood	
	04 basalt	
	05 quartz	
	06 quartzite	
	07 argillite	
	08 siltstone	
	09 jasper	
	10 obsidian	
	11 ignimbrite	
	12 sandstone	
	13 shale	
	14 slate	
	15 rhyolite	
5	Material Appearance (1)	15
	1 banded/mottled	
	2 dendritic	
	3 solid	
6	Material Appearance (2)	16
	1 translucent	
	2 opaque	
7	Material Color	17-18
	01 red	
	02 white	
	03 black	
	04 grey	
	05 brown	
	06 gold/ochre	
8	Condition	20
	1 complete	
	2 one fragment	
	3 two fragments	
	4 three fragments	
	5 more than three fragments	
9	Cortex Remaining	21
	1 0%	
	2 1-25%	
	3 26-50%	
	4 51-75%	
	5 75%+	
10	Blank Type	22
	1 river cobble (alluvial)	
	2 colluvial cobble	
	3 core	
11	# of Utilized Ends	23
12	Which End	24
13	End Wear/Alteration	26-27
	01 flaked	
	02 pecked	
	03 ground	
	04 battered	
	05 grooved	
	06 polished	
	07 battered/step fractured	
14	Shape	28-29
	01 ovate	
	02 triangular	
	03 round	
	04 rectangular	
	05 sub-rectangular	
	06 cylindrical	
	07 parallel sided	
	08 irregular	
15	Amount of Water	30
	1 light	

Var.	Description	Column	Var.	Description	Column
	2 moderate		17	Programmer	72
	3 heavy			1 Miller	
16	Dimensions	32-43		2 Joyner	
	1 length (32-35)			3 McGuire	
	2 width (36-39)		18	Hammerstones (06)	76-77
	3 thickness (40-43)		19	Artifact Sequence #	78-80

Var.	Description	Column
1	Temporary Site Number (NP#)	1-3
2	Permanent Site Number (5JA)	5-7
3	Artifact Number (eg. NP1-__)	9-11
4	Material Type	13-14
	01 chert 02 chalcedony 03 petrified wood 04 basalt 05 quartz 06 quartzite 07 argillite 08 siltstone 09 jasper 10 obsidian 11 ignimbrite 12 sandstone 13 shale 14 slate	
5	Material Appearance (1)	15
	1 banded/mottled 2 dendritic 3 solid	
6	Material Appearance (2)	16
	1 translucent 2 opaque	
7	Material Color	17-18
	01 red 02 white 03 black 04 grey 05 brown 06 gold/achre 07 red/brown 08 pink 09 tan 10 white/grey	
8	Condition	20
	1 complete 2 proximal fragment 3 distal fragment 4 midsection 5 tip missing 6 part of base missing 7 tip/one edge missing 8 lateral edge/notch present 9 base missing 0 nearly complete (see sketch)	
9	Original Flake Scar	21
	1 bulb proximal on point 2 bulb distal on point 3 bulb lateral on point 4 present but undetermined orientation 5 absent 6 undetermined	
10	Haft Element Lateral Edge Morphology (1)	22-23
	01 parallel stemmed 02 expanding stemmed 03 contracting stemmed 04 side-notched 05 corner-notched 06 lanceolate	
11	Haft Element Lateral Edge Morphology (2)	24
	1 ground 2 unground 3 absent	
12	Haft Element Basal Edge Morphology (1)	25-26
	01 straight 02 concave (indented) 03 convex 04 notched 05 irregular	

Var.	Description	Column
13	Haft Element Basal Edge Morphology (2)	27
	1 ground	
	2 unground	
14	Blade Element Lateral Edge Morphology	28-29
	01 straight	
	02 concave	
	03 convex	
	04 serrated	
	05 parallel	
	06 ovate	
	07 irregular	
15	Tip Morphology	30
	1 rounded	
	2 sharp	
	3 needle	
	4 reworked	
	5 absent	
16	Transverse Cross-Section	31-32
	01 lenticular	
	02 plano-convex	
	03 biconvex	
	04 diamond	
	05 parallelogram	
	06 trapezoidal	
	07 biplanar	
	08 irregular	
17	Flaking Morphology (1)	34
	1 unifacial	
	2 bifacial	
18	Flaking Morphology (2)	35
	1 parallel oblique	
	2 collateral	
	3 collateral expanding	
	4 nonpatterned	
	5 pressure shaping of original flake only	
	6 transverse	
	7 transverse/medial	
19	Basal Thinning	36
	1 present	
	2 absent	
20	Retouch/Rework (leave blank if absent)	37
	1 unifacial	
	2 bifacial	
	3 bibeveled	
	4 undetermined	
21	Edge Wear -- which edge	38
22	Edge Wear/Alteration	39-40
	01 burination	
	02 proximal impact	
	03 distal impact	
	04 proximal and distal impact	
	05 lateral impact	
	06 step/scalar/polish	
	07 step fractures	
	08 scalar flakes	
	09 facetting	
	10 crushing	
	11 polish	
	12 rounding	
	13 striations parallel to edge	
	14 striations perpendicular to edge	
	15 striations multidirectional	
	16 opalization	
	17 scalar/proximal base hinge/distal snap fracture	
	18 tang snap/scalar	
	19 scalar/distal impact	
	20 reworked base (partial)	
	21 base and tip snap fractured	
	22 scalar/step/rounding	
	23 distal impact/lateral impact/step/scalar	

Var.	Description	Column
	24 step/rounding	
	25 proximal impact/distal impact/step/ crushing	
	26 scalar/step	
	27 distal impact/step/rounding	
	28 reworked blade element	
	29 distal impact/lateral impact/ lateral base snap	
	30 tang snap/distal impact	
	31 distal impact/edge facet/polish/ step	
	32 proximal base hinge	
	33 bilateral tangs absent	
	34 unilateral tangs absent	
	35 bilateral tangs absent/scalar/ proximal base hinge/distal impact	
	36 midsection hinge	
	37 lateral hinge on blade	
23	Dorsal Surface Wear (surface 1)	41-42
	01 burination	
	02 proximal impact	
	03 distal impact	
	04 proximal and distal impact	
	05 lateral impact	
	06 step/scalar	
	07 step fractures	
	08 scalar flakes	
	09 striations parallel to edge	
	10 striations perpendicular to edge	
	11 striations multidirectional	
	12 polish	
	13 even rounding	
	14 uneven rounding	
	15 opalization	
	16 proximal base hinge	

Var.	Description	Column
24	Ventral Surface Wear (surface 2)	43-44
	01 burination	
	02 proximal impact	
	03 distal impact	
	04 proximal and distal impact	
	05 lateral impact	
	06 step/scalar	
	07 step fractures	
	08 scalar flakes	
	09 striations parallel to edge	
	10 striations perpendicular to edge	
	11 striations multidirectional	
	12 polish	
	13 even rounding	
	14 uneven rounding	
	15 opalization	
	16 proximal base hinge	
25	Dimensions	45-70
	1 maximum length (45-48)	
	2 max. haft length (49-51)	
	3 max. blade length (52-55)	
	4 Max. haft width (56-58)	
	5. max. blade width (59-61)	
	6 max. haft thickneses (62-64)	
	7 max. blade thickness (65-67)	
	8 basal contact width (68-70)	
26	Programmer	72
	1 Miller	
	2 Joyner	
	3 McGuire	
27	Projectile Points (03)	76-77
28	Artifact Sequence #	78-80

Var.	Description	Column
1	Temporary Site Number (NP#)	1-3
2	Permanent Site Number (5JA)	5-7
3	Artifact Number (eg. NP1-__)	9-11
4	Grinding Stone Type	13
	1 mano 2 metate 3 abrader 4 shaft straightener 5 multifunctional	
5	Condition	14
	1 complete 2 fragmentary	
6	Surface Alteration (1)	15
	1 unifacial 2 bifacial 3 multifacial	
7	Surface Alteration (2)	16
	1 pigment stains 2 grips 3 pecking 4 battering 5 polished 6 grips, pecking, polished 7 pecking, polished	
8	Striations (orient. to long axis)	17
	1 parallel 2 perpendicular 3 diagonal 4 circular 5 multidirectional 6 unknown (but present) 7 absent (macroscopically)	
9	Metate Association (not for (metates)	18
	1 yes 2 no	
10	Amount of Usage	19
	1 blank 2 slight 3 medium 4 heavy 5 exhausted 6 one surface slight, one surface medium 7 one surface heavy, one surface medium	
11	Material Type	20
	1 sandstone 2 basalt 3 granite 4 quartz 5 quartzite	
12	Material Texture	21
	1 fine 2 medium 3 coarse	
13	Form	23-24
	01 rectangular 02 subrectangular 03 ovate 04 round 05 oblong 06 square 07 sub-square 08 irregular geometric 09 egg 10 trapezoidal 11 symmetrical 12 fragment	
14	Longitudinal Cross-Section	25-26
	01 flat	

Var.	Description	Column
	02 convex	
	03 concave	
	04 rounded ends	
	05 fragment (irregular)	
	06 flat, rounded ends	
	07 tapered	
15	Transverse Cross-Section	27-28
	01 rectangular	
	02 trapezoidal	
	03 convexo-triangular	
	04 diamond	
	05 ovate	
	06 plano-convex	
	07 plano-triangular	
	08 square	
	09 fragment	
	10 irregular	
	11 biconvex	
16	Worked Surface Shape	29-30
	01 flat	
	02 keeled	
	03 convex	
	04 concave	
	05 facetted	
	06 slab	
	07 trough	
	08 basin	
	09 one flat surface, one keeled	
	10 two flat surfaces	
	11 one convex surface, one keeled, two lateral edges flat	
	12 two convex surfaces	
	13 one flat surface, one convex	
18	Artifact Dimensions	32-43
	1 length (23-35)	
	2 width (36-39)	
	3 thickness (40-43)	
19	Grinding Surface (which one) (leave blank if limits unknown)	45
20	Grinding Surface Dimensions (leave blank if limits unknown)	46-57
	1 length (46-49)	
	2 width (50-53	
	3 thickness (54-57)	
21	Programmer	72
	1 Miller	
	2 Joyner	
	3 McGuire	
22	Ground Stone (07)	76-77
23	Artifact Sequence #	78-80

Var.	Description	Column
1	Temporary Site Number (NP#__)	1-3
2	Permanent Site Number (5JA__)	5-7
3	Artifact Number (eg. NP1-__)	9-11
4	Material Type	13-14
	01 chert	
	02 chalcedony	
	03 petrified wood	
	04 basalt	
	05 quartz	
	06 quartzite	
	07 argillite	
	08 siltstone	
	09 jasper	
	10 obsidian	
	11 ignimbrite	
	12 sandstone	
	13 shale	
	14 slate	
	15 rhyolite	
5	Material Apearance (1)	15
	1 banded/mottled	
	2 dendritic	
	3 solid	
6	Material Appearance (2)	16
	1 translucent	
	2 opaque	
7	Material Color	17-18
	01 red	
	02 white	
	03 black	
	04 grey	
	05 brown	
	06 gold/ochre	
	07 grey/brown	
	08 pink	
	09 pink/brown	
	10 pink/white	

Var.	Description	Column
8	Heat Alteration	19
	1 color change	
	2 crazing	
	3 potlidding	
	4 heat fracture	
	5 change in luster	
	6 color change/crazing/heat fracture	
	7 crazing/heat fracture	
	8 color change/crazing/potlidding	
	9 crazing/potlidding/heat fracture	
9	Condition	20
	1 complete	
	2 proximal fragment	
	3 distal fragment	
	4 midsection	
	5 undetermined fragment	
	6 nearly complete	
10	Original Flake Scar	21
	1 bulb proximal on biface	
	2 bulb distal on biface	
	3 bulb lateral on biface	
	4 present but undetermined orientation	
	5 absent	
	6 biface made from a lag pebble	
11	Cortex Remaining	22
	1 0%	
	2 1-25%	
	3 26-5%	
	4 51-75%	
	5 75%+	
12	Outline	23-24
	01 ovate	
	02 leaf-shaped	
	03 lanceolate	
	04 tear drop	
	05 triangular	
	06 discoidal	
	07 irregular	

Var.	Description	Column
	08 hafted	
	09 lateral edge fragment	
	10 too incomplete for identification	
13	Utilization (use-wear)	26
	1 yes	
	2 no	
	3 possible core	
14	# Utilized Edges	27
15	# Retouched Edges	28
16	Which Edge	29
17	Utilized Edge	30
	1 proximal	
	2 lateral	
	3 distal	
	4 undetermined	
18	Length of Utilized Edge	31-34
19	Retouched Edge	35
	1 proximal	
	2 lateral	
	3 distal	
	4 undetermined	
20	Length of Retouched Edge	36-39
21	Edge Angle (°)	40-42
22	Edge Shape	43
	1 convex	
	2 concave	
	3 straight	
	4 wavy	
	5 pointed	
	6 serrated	
	7 irregular	
23	Utilization	44
	1 unifacial	
	2 bifacial	
	3 edge only	
24	Retouch	45
	1 unifcial	
	2 bifacial	
25	Edge Wear	46-47
	01 burination	
	02 step fractures	
	03 scalar flakes	
	04 impact fractures	
	05 facetting	
	06 crushing	
	07 polish	
	08 rounding	
	09 striations parallel to edge	
	10 striations perpendicular to edge	
	11 striations multidirectional	
	12 opalization	
	13 step/crushing/rounding	
	14 step/polish/rounding	
	15 step/polish	
	16 rounding/polish/facetting	
	17 facetting/polish/striations perpendicular	
	18 rounding/polish	
	19 facetting/polish	
26	Surface 1 Utilization	48-49
	01 step/uneven rounding	
	02 step fractures	
	03 scalar flakes	
	04 impact fractures	
	05 striations parallel to edge	
	06 striations perpendicular to edge	
	07 striations multidirectional	
	08 polish	
	09 even rounding	
	10 uneven rounding	
	11 opalization	
	12	
	13 step/hinge	

Var.	Description	Column
	14 step/polish	
	15 step/scalar	
27	Surface 2 Utilization	50-51
	01	
	02 step fractures	
	03 scalar flakes	
	04 impact fractures	
	05 striations parallel to edge	
	06 striations perpendicular to edge	
	07 striations multidirectional	
	08 polish	
	09 even rounding	
	10 uneven rounding	
	11 opalization	
	12 scalar/step	
	13 scalar/polish/rounding	

Var.	Description	Column
	14 step/polish	
28	Dimensions	53-63
	1 length (53-56)	
	2 width (57-60)	
	3 thickness (61-63)	
29	Programmer	72
	1 Miller	
	2 Joyner	
	3 McGuire	
30	Bifaces (04)	76-77
	Patterned End Scraper (08)	
31	Artifact Sequence #	78-80

Appendix F.

SITE CHRONOLOGY AND SITE TYPE LISTED
SEQUENTIALLY BY SITE

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	PALEO	EARCHAIC	MARCHAIC	LARCHAIC	LPREHIST	SITETYPE
1	6.	-0	-0	-0	-0	-0	1.
2	47.	-0	-0	1.	1.	1.	8.
3	143.	-0	-0	-0	-0	-0	3.
4	144.	-0	-0	-0	1.	-0	3.
5	146.	-0	-0	-0	-0	-0	3.
6	147.	-0	-0	-0	1.	-0	3.
7	148.	-0	-0	-0	1.	-0	4.
8	149.	-0	-0	-0	1.	-0	4.
9	150.	-0	-0	-0	1.	-0	3.
10	151.	-0	-0	1.	-0	-0	1.
11	152.	-0	-0	-0	-0	-0	1.
12	153.	-0	-0	-0	1.	-0	1.
13	154.	-0	-0	-0	-0	-0	2.
14	155.	-0	-0	-0	1.	1.	3.
15	156.	-0	-0	-0	-0	-0	2.
16	157.	-0	-0	-0	-0	-0	1.
17	158.	-0	-0	-0	-0	1.	3.
18	159.	-0	-0	-0	-0	-0	1.
19	160.	-0	-0	-0	-0	1.	1.
20	161.	-0	1.	-0	-0	1.	1.
21	162.	-0	-0	-0	-0	1.	3.
22	163.	-0	-0	-0	-0	-0	3.
23	164.	-0	1.	-0	1.	-0	3.
24	165.	-0	-0	1.	1.	-0	1.
25	166.	-0	1.	1.	-0	-0	4.
26	167.	-0	1.	1.	1.	-0	4.
27	168.	-0	-0	-0	-0	1.	3.
28	169.	1.	-0	-0	-0	-0	1.
29	170.	-0	-0	-0	-0	1.	3.
30	171.	-0	-0	1.	-0	-0	1.
31	172.	-0	-0	-0	-0	-0	1.
32	173.	-0	-0	-0	-0	-0	3.
33	174.	-0	-0	-0	-0	-0	1.
34	175.	-0	-0	-0	1.	-0	3.
35	176.	-0	-0	-0	-0	-0	1.
36	177.	1.	1.	1.	1.	1.	4.
37	178.	-0	-0	1.	1.	-0	3.
38	179.	-0	-0	-0	-0	-0	1.
39	180.	-0	-0	-0	-0	1.	1.
40	181.	-0	-0	-0	-0	1.	1.
41	182.	-0	-0	-0	1.	-0	8.
42	183.	-0	-0	-0	-0	-0	2.
43	184.	-0	-0	-0	-0	-0	1.
44	185.	-0	-0	-0	-0	-0	1.
45	186.	-0	-0	-0	-0	1.	4.
46	187.	-0	-0	-0	1.	1.	2.
47	190.	-0	-0	-0	-0	-0	1.
48	191.	-0	-0	-0	1.	1.	1.
49	192.	-0	-0	-0	-0	-0	1.
50	193.	-0	-0	-0	-0	1.	3.
51	194.	-0	-0	1.	-0	-0	1.

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	PALEO	EARCHAIC	MARCHAIC	LARCHAIC	LPREHIST	SITETYPE
52	195.	-0	-0	1.	-0	1.	3.
53	196.	-0	-0	-0	-0	-0	1.
54	197.	-0	-0	-0	-0	-0	1.
55	198.	-0	-0	-0	-0	-0	1.
56	199.	-0	-0	-0	-0	-0	1.
57	200.	-0	-0	-0	-0	-0	1.
58	201.	-0	-0	-0	-0	-0	3.
59	202.	-0	-0	-0	1.	-0	3.
60	203.	-0	-0	-0	-0	1.	1.
61	205.	-0	-0	-0	-0	-0	3.
62	231.	1.	-0	-0	1.	-0	3.
63	232.	-0	-0	-0	-0	-0	1.
64	233.	-0	-0	-0	-0	-0	1.
65	234.	-0	1.	-0	-0	1.	1.
66	235.	-0	-0	-0	-0	-0	2.
67	237.	-0	-0	-0	1.	-0	1.
68	238.	1.	-0	1.	1.	1.	4.
69	239.	-0	-0	1.	-0	-0	1.
70	240.	1.	-0	-0	1.	-0	3.
71	241.	-0	-0	1.	-0	-0	2.
72	242.	-0	-0	-0	-0	-0	4.
73	243.	-0	-0	-0	-0	1.	3.
74	244.	-0	-0	-0	1.	-0	1.
75	245.	1.	-0	1.	-0	-0	3.
76	246.	-0	-0	-0	-0	-0	2.
77	247.	-0	-0	-0	1.	-0	2.
78	249.	-0	-0	-0	1.	-0	2.
79	250.	-0	-0	-0	1.	-0	1.
80	253.	-0	-0	1.	-0	-0	1.
81	254.	1.	1.	-0	1.	1.	4.
82	255.	-0	-0	-0	1.	-0	3.
83	256.	-0	-0	-0	-0	-0	1.
84	257.	-0	-0	-0	-0	1.	4.
85	258.	-0	-0	-0	-0	-0	1.
86	259.	-0	-0	-0	-0	-0	3.
87	260.	-0	-0	-0	-0	-0	1.
88	261.	-0	-0	-0	-0	1.	3.
89	262.	-0	-0	-0	-0	1.	4.
90	263.	-0	-0	-0	1.	-0	2.
91	264.	-0	-0	-0	-0	-0	4.
92	265.	-0	1.	-0	-0	-0	4.
93	267.	-0	-0	-0	-0	-0	3.
94	269.	-0	-0	-0	-0	-0	1.
95	270.	-0	-0	-0	-0	-0	3.
96	271.	-0	-0	-0	-0	-0	1.
97	272.	-0	-0	-0	1.	-0	1.
98	273.	1.	-0	1.	1.	-0	4.
99	274.	-0	-0	-0	-0	1.	4.
100	276.	-0	-0	-0	-0	-0	4.
101	277.	-0	-0	-0	-0	-0	2.
102	278.	-0	-0	-0	-0	-0	2.

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	PALEO	EARCHAIC	MARCHAIC	LARCHAIC	LPREHIST	SITETYPE
103	279.	-0	-0	1.	-0	-0	4.
104	280.	-0	-0	1.	-0	-0	4.
105	281.	-0	-0	-0	-0	-0	1.
106	282.	-0	-0	-0	-0	-0	1.
107	283.	-0	-0	-0	-0	-0	1.
108	284.	-0	-0	-0	-0	-0	2.
109	285.	-0	-0	-0	-0	-0	1.
110	286.	-0	1.	-0	-0	-0	2.
111	287.	-0	-0	-0	-0	-0	3.
112	288.	1.	-0	-0	-0	-0	3.
113	289.	-0	-0	-0	-0	-0	2.
114	290.	-0	-0	-0	-0	-0	1.
115	291.	-0	-0	-0	-0	1.	1.
116	292.	-0	-0	-0	-0	-0	1.
117	293.	-0	-0	-0	-0	-0	1.
118	294.	-0	-0	-0	-0	1.	2.
119	295.	1.	-0	-0	1.	1.	4.
120	297.	-0	1.	-0	-0	-0	4.
121	298.	-0	-0	-0	-0	-0	1.
122	299.	-0	-0	1.	-0	-0	4.
123	300.	-0	-0	1.	1.	-0	1.
124	301.	-0	1.	1.	1.	-0	4.
125	302.	-0	-0	-0	1.	1.	4.
126	303.	-0	-0	-0	-0	-0	1.
127	304.	-0	1.	-0	1.	1.	4.
128	305.	-0	-0	1.	-0	-0	3.
129	306.	-0	-0	-0	1.	-0	1.
130	307.	-0	-0	-0	-0	1.	2.
131	308.	1.	-0	-0	-0	-0	3.
132	309.	-0	-0	-0	-0	-0	1.
133	311.	-0	-0	-0	-0	1.	7.
134	312.	-0	-0	-0	1.	-0	8.
135	313.	-0	-0	-0	-0	1.	1.
136	314.	-0	-0	-0	-0	1.	2.
137	315.	-0	-0	-0	-0	-0	6.
138	316.	-0	-0	1.	-0	-0	4.
139	317.	-0	-0	-0	-0	-0	4.
140	318.	-0	-0	-0	-0	1.	5.
141	319.	-0	-0	-0	-0	-0	2.
142	320.	1.	1.	-0	1.	1.	4.
143	321.	-0	-0	-0	-0	-0	2.
144	322.	-0	-0	-0	1.	1.	4.
145	324.	-0	-0	-0	-0	-0	1.
146	325.	-0	-0	-0	1.	-0	2.
147	326.	-0	-0	-0	-0	-0	6.
148	327.	-0	-0	-0	-0	1.	2.
149	328.	-0	-0	-0	-0	-0	1.
150	329.	-0	-0	-0	-0	1.	1.
151	330.	-0	-0	-0	-0	-0	1.

Appendix G.

SITES LISTED BY COMPONENT

(Single component sites listed first, followed by multicomponent sites. Sites with no components listed last.)

FILE NORTH (CREATION DATE = 79/12/15.) PARK SITE DATA

CASE-NO	SITE	PALEO	EARCHAIC	MARCHAIC	LARCHAIC	LPREHIST	SITETYPE
1	169.	1.	-0	-0	-0	-0	1.
2	283.	1.	-0	-0	-0	-0	3.
3	308.	1.	-0	-0	-0	-0	3.
4	265.	-0	1.	-0	-0	-0	4.
5	236.	-0	1.	-0	-0	-0	2.
6	297.	-0	1.	-0	-0	-0	4.
7	151.	-0	-0	1.	-0	-0	1.
8	171.	-0	-0	1.	-0	-0	1.
9	194.	-0	-0	1.	-0	-0	1.
10	239.	-0	-0	1.	-0	-0	1.
11	241.	-0	-0	1.	-0	-0	2.
12	253.	-0	-0	1.	-0	-0	1.
13	270.	-0	-0	1.	-0	-0	4.
14	230.	-0	-0	1.	-0	-0	4.
15	299.	-0	-0	1.	-0	-0	4.
16	305.	-0	-0	1.	-0	-0	3.
17	316.	-0	-0	1.	-0	-0	4.
18	144.	-0	-0	-0	1.	-0	3.
19	147.	-0	-0	-0	1.	-0	3.
20	143.	-0	-0	-0	1.	-0	4.
21	149.	-0	-0	-0	1.	-0	4.
22	150.	-0	-0	-0	1.	-0	3.
23	153.	-0	-0	-0	1.	-0	1.
24	175.	-0	-0	-0	1.	-0	3.
25	182.	-0	-0	-0	1.	-0	8.
26	202.	-0	-0	-0	1.	-0	3.
27	237.	-0	-0	-0	1.	-0	1.
28	244.	-0	-0	-0	1.	-0	1.
29	247.	-0	-0	-0	1.	-0	2.
30	249.	-0	-0	-0	1.	-0	2.
31	250.	-0	-0	-0	1.	-0	1.
32	255.	-0	-0	-0	1.	-0	3.
33	263.	-0	-0	-0	1.	-0	2.
34	272.	-0	-0	-0	1.	-0	1.
35	306.	-0	-0	-0	1.	-0	1.
36	312.	-0	-0	-0	1.	-0	8.
37	325.	-0	-0	-0	1.	-0	2.
38	158.	-0	-0	-0	-0	1.	3.
39	160.	-0	-0	-0	-0	1.	1.
40	162.	-0	-0	-0	-0	1.	3.
41	163.	-0	-0	-0	-0	1.	3.
42	170.	-0	-0	-0	-0	1.	3.
43	180.	-0	-0	-0	-0	1.	1.
44	181.	-0	-0	-0	-0	1.	1.
45	186.	-0	-0	-0	-0	1.	4.
46	193.	-0	-0	-0	-0	1.	3.
47	203.	-0	-0	-0	-0	1.	1.
48	243.	-0	-0	-0	-0	1.	3.
49	327.	-0	-0	-0	-0	1.	2.
50	257.	-0	-0	-0	-0	1.	4.
51	261.	-0	-0	-0	-0	1.	3.

FILE NORTH (CREATION DATE = 79/12/16.) PARK SITE DATA

CASE-NO	SITE	PALEO	EARCHAIC	MARCHAIC	LARCHAIC	LPREHIST	SITETYPE
52	262.	-0	-0	-0	-0	1.	4.
53	274.	-0	-0	-0	-0	1.	4.
54	291.	-0	-0	-0	-0	1.	1.
55	294.	-0	-0	-0	-0	1.	2.
56	307.	-0	-0	-0	-0	1.	2.
57	311.	-0	-0	-0	-0	1.	7.
58	313.	-0	-0	-0	-0	1.	1.
59	314.	-0	-0	-0	-0	1.	2.
60	316.	-0	-0	-0	-0	1.	5.
61	329.	-0	-0	-0	-0	1.	1.
62	245.	1.	-0	1.	-0	-0	3.
63	231.	1.	-0	-0	1.	-0	3.
64	240.	1.	-0	-0	1.	-0	3.
65	166.	-0	1.	1.	-0	-0	4.
66	164.	-0	1.	-0	1.	-0	3.
67	161.	-0	1.	-0	-0	1.	1.
68	236.	-0	1.	-0	-0	1.	1.
69	165.	-0	-0	1.	1.	-0	1.
70	174.	-0	-0	1.	1.	-0	3.
71	300.	-0	-0	1.	1.	-0	1.
72	195.	-0	-0	1.	-0	1.	3.
73	155.	-0	-0	-0	1.	1.	3.
74	137.	-0	-0	-0	1.	1.	2.
75	191.	-0	-0	-0	1.	1.	1.
76	30[illegible].	-0	-0	-0	1.	1.	4.
77	322.	-0	-0	-0	1.	1.	4.
78	273.	1.	-0	1.	1.	-0	4.
79	295.	1.	-0	-0	1.	1.	4.
80	167.	-0	1.	1.	1.	-0	4.
81	301.	-0	1.	1.	1.	-0	4.
82	304.	-0	1.	-0	1.	1.	4.
83	47.	-0	-0	1.	1.	1.	8.
84	254.	1.	1.	-0	1.	1.	4.
85	320.	1.	1.	-0	1.	1.	4.
86	238.	1.	-0	1.	1.	1.	4.
87	177.	1.	1.	1.	1.	1.	4.
88	6.	-0	-0	-0	-0	-0	1.
89	143.	-0	-0	-0	-0	-0	3.
90	146.	-0	-0	-0	-0	-0	3.
91	152.	-0	-0	-0	-0	-0	1.
92	154.	-0	-0	-0	-0	-0	2.
93	156.	-0	-0	-0	-0	-0	2.
94	157.	-0	-0	-0	-0	-0	1.
95	159.	-0	-0	-0	-0	-0	1.
96	163.	-0	-0	-0	-0	-0	3.
97	172.	-0	-0	-0	-0	-0	1.
98	173.	-0	-0	-0	-0	-0	3.
99	174.	-0	-0	-0	-0	-0	1.
100	176.	-0	-0	-0	-0	-0	1.
101	179.	-0	-0	-0	-0	-0	1.
102	183.	-0	-0	-0	-0	-0	2.

FILE NORTH (CREATION DATE = 79/12/16.) PARK SITE DATA

CASE-NO	SITE	PALEO	EARCHAIC	MARCHAIC	LARCHAIC	LPREHIST	SITETYPE
103	184.	-0	-0	-0	-0	-0	1.
104	185.	-0	-0	-0	-0	-0	1.
105	190.	-0	-0	-0	-0	-0	1.
106	192.	-0	-0	-0	-0	-0	1.
107	196.	-0	-0	-0	-0	-0	1.
108	197.	-0	-0	-0	-0	-0	1.
109	198.	-0	-0	-0	-0	-0	1.
110	199.	-0	-0	-0	-0	-0	1.
111	200.	-0	-0	-0	-0	-0	1.
112	201.	-0	-0	-0	-0	-0	3.
113	205.	-0	-0	-0	-0	-0	3.
114	232.	-0	-0	-0	-0	-0	1.
115	233.	-0	-0	-0	-0	-0	1.
116	235.	-0	-0	-0	-0	-0	2.
117	242.	-0	-0	-0	-0	-0	4.
118	246.	-0	-0	-0	-0	-0	2.
119	256.	-0	-0	-0	-0	-0	1.
120	258.	-0	-0	-0	-0	-0	1.
121	259.	-0	-0	-0	-0	-0	3.
122	260.	-0	-0	-0	-0	-0	1.
123	261.	-0	-0	-0	-0	-0	4.
124	267.	-0	-0	-0	-0	-0	3.
125	269.	-0	-0	-0	-0	-0	1.
126	270.	-0	-0	-0	-0	-0	3.
127	271.	-0	-0	-0	-0	-0	1.
128	276.	-0	-0	-0	-0	-0	4.
129	277.	-0	-0	-0	-0	-0	2.
130	278.	-0	-0	-0	-0	-0	2.
131	281.	-0	-0	-0	-0	-0	1.
132	282.	-0	-0	-0	-0	-0	1.
133	283.	-0	-0	-0	-0	-0	1.
134	284.	-0	-0	-0	-0	-0	2.
135	285.	-0	-0	-0	-0	-0	1.
136	287.	-0	-0	-0	-0	-0	3.
137	289.	-0	-0	-0	-0	-0	2.
138	290.	-0	-0	-0	-0	-0	1.
139	292.	-0	-0	-0	-0	-0	1.
140	293.	-0	-0	-0	-0	-0	1.
141	298.	-0	-0	-0	-0	-0	1.
142	303.	-0	-0	-0	-0	-0	1.
143	309.	-0	-0	-0	-0	-0	1.
144	315.	-0	-0	-0	-0	-0	6.
145	317.	-0	-0	-0	-0	-0	4.
146	319.	-0	-0	-0	-0	-0	2.
147	321.	-0	-0	-0	-0	-0	2.
148	324.	-0	-0	-0	-0	-0	1.
149	326.	-0	-0	-0	-0	-0	6.
150	328.	-0	-0	-0	-0	-0	1.
151	330.	-0	-0	-0	-0	-0	1.

Appendix H.

ARTIFACT DATA USED IN STATISTICAL ANALYSIS
LISTED BY SITE FOR ALL PREHISTORIC SITES

KEY FOR ARTIFACT CODE NAMES

Code Name	Descriptive Term
SITE	Smithsonian Site Number
POINTS	Projectile Points
UTILPTS	Utilized Projectile Points
MANOS	Manos
METATES	Metates
CUTTING	Cutting Tools
SCRAPING	Scraping Tools
SAWING	Sawing Tools
UTFLAKES	Utilized Flakes (other than sawing, scraping and cutting tools)
UTBIFACE	Utilized Bifaces
BIFACE	Non-utilized Bifaces
CHOPPERS	Chopping Tools
MATTYPE	Material Types, Number of
ENDSCRP	Patterned End Scrapers
HAMMERS	Hammerstones

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	POINTS	UTILPTS	MANOS	METATES	CUTTING	SCRAPING	SAWING	UTFLAKES	UTBIFACE	BIFACE
1	6.	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0
2	47.	12.	-0	-0	-0	-0	3.	2.	-0	-0	-0
3	143.	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0
4	144.	3.	-0	-0	-0	-0	2.	1.	-0	-0	1.
5	146.	2.	1.	5.	2.	-0	6.	3.	-0	1.	-0
6	147.	2.	1.	1.	2.	-0	1.	-0	-0	2.	5.
7	148.	2.	-0	3.	1.	-0	7.	2.	-0	4.	5.
8	149.	1.	-0	-0	1.	-0	2.	-0	-0	-0	-0
9	150.	4.	3.	1.	-0	1.	1.	2.	-0	-0	1.
10	151.	2.	1.	-0	-0	-0	1.	-0	-0	-0	2.
11	152.	1.	-0	-0	-0	2.	3.	-0	-0	-0	-0
12	153.	4.	-0	-0	-0	-0	3.	-0	-0	-0	2.
13	154.	-0	-0	-0	-0	-0	1.	-0	-0	-0	-0
14	155.	11.	-0	-0	-0	2.	3.	-0	-0	-0	3.
15	156.	-0	-0	-0	-0	-0	2.	-0	-0	-0	-0
16	157.	-0	-0	-0	-0	-0	6.	-0	-0	-0	-0
17	158.	1.	-0	-0	-0	-0	2.	-0	-0	-0	-0
18	159.	1.	-0	-0	-0	-0	1.	-0	-0	-0	-0
19	160.	1.	-0	-0	-0	-0	-0	-0	-0	-0	-0
20	161.	2.	-0	-0	-0	-0	2.	-0	-0	-0	-0
21	162.	4.	-0	1.	-0	-0	4.	-0	-0	3.	1.
22	163.	1.	-0	-0	-0	1.	6.	1.	-0	2.	2.
23	164.	3.	3.	-0	-0	-0	-0	1.	-0	-0	-0
24	165.	2.	-0	-0	-0	-0	-0	-0	-0	-0	-0
25	166.	3.	-0	-0	1.	-0	8.	12.	-0	3.	8.
26	167.	10.	-0	-0	1.	-0	6.	-0	2.	3.	11.
27	168.	1.	-0	-0	-0	-0	3.	2.	1.	-0	3.
28	169.	1.	-0	-0	-0	-0	-0	-0	-0	-0	1.
29	170.	1.	-0	1.	1.	-0	-0	-0	1.	-0	1.
30	171.	1.	-0	-0	-0	-0	3.	-0	-0	-0	2.
31	172.	-0	-0	-0	-0	-0	-0	-0	2.	-0	-0
32	173.	2.	-0	-0	1.	-0	1.	2.	-0	-0	1.
33	174.	-0	-0	-0	-0	-0	1.	-0	-0	-0	-0
34	175.	4.	-0	-0	-0	-0	-0	1.	3.	-0	2.
35	176.	-0	-0	-0	-0	-0	2.	-0	2.	-0	2.
36	177.	13.	-0	3.	2.	-0	16.	2.	8.	1.	12.
37	178.	4.	-0	-0	-0	-0	1.	-0	5.	1.	1.
38	179.	-0	-0	-0	-0	-0	5.	1.	1.	-0	2.
39	180.	1.	-0	-0	-0	-0	-0	-0	1.	-0	-0
40	181.	4.	-0	-0	-0	-0	-0	1.	-0	-0	-0
41	182.	3.	-0	-0	-0	-0	8.	1.	3.	-0	3.
42	183.	-0	-0	-0	-0	-0	-0	-0	-0	1.	1.
43	184.	-0	-0	-0	-0	-0	1.	-0	3.	1.	1.
44	185.	-0	-0	-0	-0	-0	3.	1.	6.	-0	-0
45	186.	1.	-0	2.	-0	-0	1.	-0	-0	-0	1.
46	187.	4.	-0	-0	-0	-0	-0	-0	-0	-0	-0
47	190.	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0
48	191.	7.	2.	-0	-0	-0	23.	7.	-0	-0	1
49	192.	2.	-0	-0	-0	-0	1.	3.	-0	-0	1.
50	193.	-0	-0	1.	-0	-0	-0	1.	-0	-0	-0
51	194.	2.	-0	-0	-0	-0	3.	-0	-0	-0	-0

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	POINTS	UTILPTS	MANOS	METATES	CUTTING	SCRAPING	SAWING	UTFLAKES	UTBIFACE	BIFACE
52	195.	2.	-0	-0	-0	-0	10.	-0	-0	1.	2.
53	196.	-0	-0	-0	-0	-0	1.	-0	-0	-0	1.
54	197.	-0	-0	-0	-0	-0	2.	2.	-0	-0	1.
55	198.	-0	-0	-0	-0	1.	2.	2.	-0	-0	-0
56	199.	-0	-0	-0	-0	1.	2.	1.	-0	-0	-0
57	200.	-0	-0	-0	-0	-0	-0	-0	-0	1.	1.
58	201.	-0	-0	-0	-0	-0	1.	-0	-0	1.	-0
59	202.	3.	1.	1.	1.	-0	1.	3.	-0	1.	5.
60	203.	1.	-0	-0	-0	-0	6.	2.	-0	-0	3.
61	205.	-0	-0	-0	-0	-0	3.	9.	-0	3.	5.
62	231.	4.	-0	-0	-0	3.	5.	-0	4.	1.	1.
63	232.	1.	-0	-0	-0	-0	1.	-0	-0	-0	-0
64	233.	-0	-0	-0	-0	-0	-0	-0	-0	1.	1.
65	234.	3.	-0	-0	-0	-0	1.	-0	-0	-0	1.
66	235.	-0	-0	-0	-0	-0	-0	-0	-0	-0	1.
67	237.	2.	-0	-0	-0	-0	-0	-0	-0	-0	1.
68	238.	6.	-0	1.	3.	-0	1.	-0	1.	1.	1.
69	239.	2.	-0	-0	-0	-0	-0	-0	-0	-0	-0
70	240.	2.	-0	-0	1.	-0	1.	-0	-0	-0	-0
71	241.	1.	-0	-0	-0	-0	-0	-0	-0	-0	-0
72	242.	-0	-0	-0	1.	-0	1.	-0	1.	1.	-0
73	243.	1.	-0	-0	-0	1.	-0	-0	1.	1.	1.
74	244.	2.	-0	-0	-0	-0	-0	-0	-0	-0	-0
75	245.	7.	-0	1.	3.	2.	6.	-0	1.	1.	11.
76	246.	-0	-0	-0	-0	1.	-0	-0	-0	-0	-0
77	247.	1.	-0	-0	-0	-0	-0	-0	-0	-0	-0
78	249.	3.	-0	-0	-0	-0	2.	-0	-0	-0	-0
79	250.	1.	-0	-0	-0	-0	-0	-0	-0	-0	-0
80	253.	1.	-0	-0	-0	-0	-0	-0	-0	-0	-0
81	254.	8.	1.	1.	1.	3.	3.	-0	-0	3.	1.
82	255.	1.	-0	-0	3.	-0	3.	-0	-0	2.	1.
83	256.	-0	-0	-0	-0	1.	-0	-0	-0	-0	-0
84	257.	1.	-0	-0	-0	1.	-0	-0	1.	-0	2.
85	258.	-0	-0	-0	-0	-0	-0	1.	-0	1.	-0
86	259.	1.	-0	1.	-0	-0	2.	-0	-0	-0	1.
87	260.	-0	-0	-0	-0	-0	1.	-0	-0	-0	-0
88	261.	3.	1.	1.	-0	1.	-0	-0	-0	-0	4.
89	262.	-0	-0	-0	-0	-0	2.	-0	-0	1.	1.
90	263.	3.	-0	-0	-0	-0	-0	-0	-0	-0	-0
91	264.	-0	-0	2.	13.	-0	-0	-0	-0	2.	-0
92	265.	1.	1.	3.	4.	-0	1.	-0	-0	2.	2.
93	267.	3.	1.	1.	1.	2.	1.	-0	-0	1.	-0
94	269.	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0
95	270.	-0	-0	1.	6.	3.	3.	-0	1.	3.	4.
96	271.	-0	-0	-0	-0	-0	1.	-0	-0	-0	4.
97	272.	2.	-0	-0	-0	-0	-0	-0	-0	1.	-0
98	273.	8.	-0	2.	-0	-0	-0	-0	1.	-0	2.
99	274.	3.	-0	-0	-0	2.	1.	-0	1.	-0	1.
100	276.	-0	-0	1.	-0	2.	3.	-0	4.	-0	1.
101	277.	-0	-0	-0	-0	3.	2.	-0	1.	-0	1.
102	278.	-0	-0	-0	-0	-0	1.	-0	1.	1.	-0

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	POINTS	UTILPTS	MANOS	METATES	CUTTING	SCRAPING	SAWING	UTFLAKES	UTBIFACE	BIFACE
103	279.	1.	-0	-0	-0	3.	4.	-0	1.	1.	-0
104	280.	3.	-0	1.	-0	-0	2.	1.	-0	-0	-0
105	281.	-0	-0	-0	-0	-0	1.	-0	1.	-0	-0
106	282.	-0	-0	-0	-0	-0	3.	-0	-0	-0	-0
107	283.	-0	-0	-0	-0	-0	-0	-0	-0	-0	1.
108	284.	-0	-0	-0	-0	-0	-0	1.	1.	-0	1.
109	285.	-0	-0	1.	1.	-0	-0	-0	-0	-0	1.
110	286.	3.	-0	1.	1.	-0	-0	2.	1.	-0	3.
111	287.	2.	-0	3.	-0	-0	1.	-0	-0	-0	1.
112	288.	1.	-0	1.	-0	-0	1.	-0	1.	3.	1.
113	289.	-0	-0	-0	-0	-0	1.	-0	-0	-0	-0
114	290.	-0	-0	-0	-0	-0	2.	-0	-0	1.	-0
115	291.	1.	-0	-0	-0	2.	3.	-0	1.	-0	2.
116	292.	-0	-0	-0	-0	-0	4.	-0	-0	-0	-0
117	293.	-0	-0	-0	-0	3.	2.	1.	1.	-0	1.
118	294.	1.	-0	-0	-0	-0	-0	-0	-0	-0	-0
119	295.	7.	-0	-0	2.	3.	6.	-0	2.	2.	3.
120	297.	2.	-0	-0	4.	-0	1.	-0	-0	-0	4.
121	298.	-0	-0	-0	-0	-0	-0	-0	1.	-0	-0
122	299.	2.	-0	1.	-0	-0	4.	-0	-0	2.	3.
123	300.	3.	-0	-0	-0	-0	-0	-0	-0	-0	2.
124	301.	3.	1.	3.	9.	-0	-0	1.	-0	-0	5.
125	302.	3.	-0	1.	-0	-0	2.	-0	-0	-0	-0
126	303.	-0	-0	-0	-0	-0	-0	1.	-0	-0	-0
127	304.	6.	-0	1.	4.	1.	2.	1.	1.	1.	3.
128	305.	1.	-0	-0	-0	-0	3.	-0	1.	3.	2.
129	306.	2.	1.	-0	-0	3.	1.	-0	-0	-0	-0
130	307.	1.	-0	-0	-0	-0	4.	-0	2.	-0	2.
131	308.	2.	-0	3.	-0	7.	3.	-0	6.	2.	9.
132	309.	1.	-0	-0	-0	-0	-0	-0	-0	-0	-0
133	311.	1.	-0	-0	-0	2.	2.	-0	-0	1.	3.
134	312.	4.	-0	2.	-0	1.	3.	-0	1.	1.	3.
135	313.	1.	-0	-0	-0	-0	-0	-0	-0	1.	-0
136	314.	1.	-0	-0	-0	1.	-0	-0	1.	1.	1.
137	315.	-0	-0	-0	-0	1.	-0	-0	4.	2.	2.
138	316.	2.	-0	1.	-0	-0	1.	1.	-0	2.	2.
139	317.	1.	-0	1.	1.	-0	2.	1.	-0	1.	3.
140	318.	1.	-0	-0	-0	-0	-0	-0	-0	-0	-0
141	319.	-0	-0	-0	1.	-0	-0	2.	-0	1.	1.
142	320.	8.	-0	3.	7.	-0	9.	8.	4.	-0	5.
143	321.	1.	-0	-0	-0	-0	2.	-0	-0	-0	3.
144	322.	2.	-0	1.	-0	-0	3.	1.	-0	2.	1.
145	324.	-0	-0	-0	-0	-0	-0	1.	-0	-0	-0
146	325.	1.	-0	-0	-0	-0	3.	-0	-0	-0	-0
147	326.	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0
148	327.	2.	-0	-0	-0	-0	-0	-0	-0	-0	1.
149	328.	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0
150	329.	1.	-0	-0	-0	-0	-0	-0	-0	-0	-0
151	330.	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	CHOPPERS	MATTYPE	ENDSCRP	HAMMERS
1	6.	-0	-0	-0	-0
2	47.	-0	3.	-0	-0
3	143.	-0	-0	-0	-0
4	144.	-0	2.	-0	-0
5	146.	1.	4.	1.	-0
6	147.	-0	1.	-0	-0
7	148.	2.	4.	1.	1.
8	149.	-0	1.	-0	-0
9	150.	-0	4.	-0	-0
10	151.	-0	1.	-0	2.
11	152.	-0	4.	-0	-0
12	153.	-0	2.	-0	-0
13	154.	-0	1.	-0	-0
14	155.	1.	3.	1.	-0
15	156.	-0	1.	-0	-0
16	157.	-0	5.	1.	-0
17	158.	-0	1.	-0	-0
18	159.	-0	1.	-0	-0
19	160.	-0	-0	-0	-0
20	161.	-0	2.	-0	-0
21	162.	-0	3.	3.	-0
22	163.	-0	5.	-0	-0
23	164.	1.	1.	-0	-0
24	165.	-0	-0	-0	-0
25	166.	1.	7.	-0	-0
26	167.	1.	3.	-0	-0
27	168.	-0	4.	2.	-0
28	169.	1.	1.	-0	-0
29	170.	1.	2.	-0	-0
30	171.	1.	2.	-0	-0
31	172.	1.	4.	-0	-0
32	173.	1.	5.	1.	-0
33	174.	-0	3.	-0	-0
34	175.	-0	3.	-0	-0
35	176.	-0	3.	-0	-0
36	177.	1.	5.	2.	-0
37	178.	-0	2.	6.	-0
38	179.	-0	3.	-0	-0
39	180.	-0	2.	-0	-0
40	181.	-0	1.	-0	-0
41	182.	-0	5.	1.	-0
42	183.	-0	-0	-0	-0
43	184.	-0	3.	-0	-0
44	185.	-0	4.	1.	-0
45	186.	-0	-0	-0	-0
46	187.	-0	-0	-0	-0
47	190.	-0	-0	-0	-0
48	191.	-0	6.	-0	-0
49	192.	-0	3.	-0	-0
50	193.	-0	1.	-0	-0
51	194.	-0	3.	-0	-0

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	CHOPPERS	MATTYPE	ENDSCRP	HAMMERS
52	195.	-0	4.	-0	-0
53	196.	-0	3.	1.	-0
54	197.	-0	2.	-0	-0
55	198.	1.	1.	-0	-0
56	199.	-0	2.	-0	-0
57	200.	-0	1.	-0	-0
58	201.	-0	2.	1.	-0
59	202.	-0	2.	-0	-0
60	203.	-0	3.	-0	-0
61	205.	-0	3.	-0	-0
62	231.	-0	4.	3.	-0
63	232.	-0	1.	-0	-0
64	233.	-0	-0	-0	-0
65	234.	-0	1.	-0	-0
66	235.	-0	-0	-0	-0
67	237.	-0	-0	-0	-0
68	238.	-0	2.	-0	-0
69	239.	-0	-0	-0	-0
70	240.	-0	1.	-0	1.
71	241.	-0	-0	-0	-0
72	242.	-0	3.	-0	-0
73	243.	-0	3.	1.	-0
74	244.	-0	-0	-0	-0
75	245.	-0	5.	1.	-0
76	246.	1.	1.	-0	-0
77	247.	-0	-0	-0	-0
78	249.	-0	1.	1.	-0
79	250.	-0	1.	-0	-0
80	253.	-0	-0	-0	-0
81	254.	1.	5.	1.	-0
82	255.	-0	2.	-0	-0
83	256.	-0	2.	-0	-0
84	257.	1.	2.	-0	-0
85	258.	-0	1.	-0	-0
86	259.	-0	3.	-0	-0
87	260.	-0	-0	-0	-0
88	261.	-0	2.	1.	-0
89	262.	-0	5.	4.	-0
90	263.	-0	-0	-0	-0
91	264.	-0	1.	-0	-0
92	265.	-0	1.	-0	-0
93	267.	-0	4.	-0	-0
94	269.	-0	-0	-0	-0
95	270.	-0	4.	-0	1.
96	271.	-0	1.	-0	-0
97	272.	-0	-0	-0	-0
98	273.	-0	1.	-0	-0
99	274.	-0	2.	-0	-0
100	276.	3.	3.	3.	4.
101	277.	-0	5.	1.	-0
102	278.	-0	2.	-0	-0

FILE NORTH (CREATION DATE = 79/11/29.) PARK SITE DATA

CASE-NO	SITE	CHOPPERS	MATTYPE	ENDSCRP	HAMMERS
103	279.	-0	4.	-0	2.
104	280.	-0	3.	-0	-0
105	281.	-0	2.	-0	-0
106	282.	-0	1.	1.	-0
107	283.	-0	-0	-0	-0
108	284.	-0	2.	-0	-0
109	285.	-0	1.	-0	-0
110	286.	-0	3.	-0	-0
111	287.	-0	1.	-0	-0
112	288.	-0	2.	-0	-0
113	289.	-0	1.	-0	-0
114	290.	-0	1.	-0	-0
115	291.	-0	1.	-0	-0
116	292.	-0	1.	-0	-0
117	293.	-0	2.	-0	-0
118	294.	-0	-0	-0	-0
119	295.	-0	6.	2.	-0
120	297.	1.	1.	-0	-0
121	298.	-0	1.	-0	-0
122	299.	1.	3.	-0	-0
123	300.	-0	1.	-0	-0
124	301.	-0	2.	-0	-0
125	302.	-0	2.	-0	-0
126	303.	-0	1.	-0	-0
127	304.	2.	6.	1.	-0
128	305.	-0	2.	-0	-0
129	306.	-0	1.	-0	-0
130	307.	-0	4.	-0	-0
131	308.	-0	6.	-0	1.
132	309.	-0	-0	-0	-0
133	311.	-0	4.	-0	-0
134	312.	-0	2.	1.	1.
135	313.	-0	1.	1.	-0
136	314.	-0	3.	-0	-0
137	315.	-0	3.	-0	-0
138	316.	-0	2.	1.	-0
139	317.	-0	3.	-0	-0
140	318.	1.	-0	-0	-0
141	319.	1.	2.	-0	-0
142	320.	1.	9.	2.	2.
143	321.	-0	3.	-0	-0
144	322.	-0	3.	-0	-0
145	324.	-0	1.	-0	-0
146	325.	-0	2.	-0	-0
147	326.	-0	-0	-0	-0
148	327.	-0	-0	-0	-0
149	328.	-0	-0	-0	-0
150	329.	1.	-0	-0	-0
151	330.	-0	1.	-0	-0

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